The Common Agricultural Policy

I intend in this essay to investigate the reasoning behind the reforms introduced in the Common Agricultural Policy (CAP) during the 1980s. I also wish to evaluate the reforms which have been introduced and outline more radical policies which could possibly be put into effect. Firstly I shall list the aims of CAP and with these in mind explore the above issues.

The aims of the CAP are outlined in article 39(1) of the Treaty establishing the European Economic Community. These are

(a) To increase agricultural productivity by promoting technical progress and by ensuring the national development of agricultural production and the optimum utilisation of the factors of production, in particular labour;

(b) Thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;

(c) To stabilise markets;

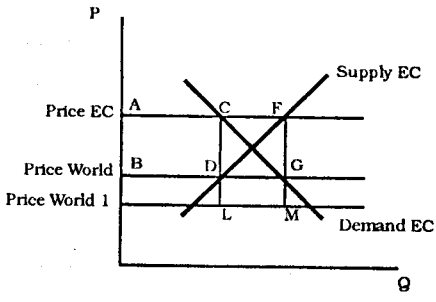
(d) To ensure the availability of supplies;

(e) To ensure that supplies reach consumers at reasonable prices.

An evident need for reform can be seen from an examination of production, cost and other agricultural statistics from the 1980s. I shall discuss these later. However as I wish to criticise the mechanisms of CAP during the decade in the context of possible alternative systems of achieving the above aims, it is important to provide some rationale for the agricultural experience under the CAP. Thus I am outlining a very simple model of how the CAP operated for many commodities during the 1980s. For example what I describe below is a reasonable description of the cereals regime over this period.

The Council of Ministers fixes target,threshold and intervention prices each year. The target price is a benchmark price from which CAP support prices are derived. The intervention price, a fixed fraction of the target price, is the price at which stocks are purchased from producers by intervention authorities, thus setting a floor price to the market. Because this domestic EC floor price tends to be above the world market price, external protection is required to maintain it. The threshold price is a notional EC permitted entry price, set equal to the EC target price less transport costs between the reference point for the target price and the main port of entry. A variable levy is imposed on imports to the Community equal to the differential between the world price and the threshold price. Prices are also supported by sales outside the Community, for which exporters may receive export refunds in order to bridge the gap between EC market prices and the world price.

Thus the CAP relied on internal support and external protection with the objective being to inflate prices to farmers above the world price level. The type of system described above is formalised in diagram(1). Examination of the diagram allows the partial equilibrium welfare effects of a transfer to this system from a free market system to be seen. Producer surplus is increased by the areas ABCD and DCF. Consumer surplus is reduced by the areas ABCD and CDG. Taxpayers lose the areas CFDG and DGLM. BY adding these gains and losses one arives at a deadweight loss of areas CDG, DGLM and FDG due to the policy.



I have modeled the EC so as to be a net importer of agricultural products at free market prices but to be a net exporter at the higher supported prices. Since the EC is a large trading bloc, it

cannot significantly change its level of exports without affecting the world price. Therefore I have portrayed the world price as falling from a free trade level (Pw)to Pw' due to the existence of the EC price support programme. From examining producer and consumer surpluses it is seen that farmers gain from supported prices and that consumers lose out. There is also a financial cost to EC taxpayers and of course a decrease in welfare for other food-exporting countries due to the fall in the world price level. Significantly the policy has a large deadweight loss due to the misallocation of resources it encourages.

I now want to discuss why reform was necessary during the 1980s both by examing how successfully CAP has achieved those aims outlined in 1957 and also in light of other considerations that have become increasingly relevent lately. One would imagine that if the aims of the CAP were not being achieved that this would lead to pressure for reform.

Firstly the aims of increased productivity and security of supply would appear to have become rather irrelevant lately. Productivity increases have been quite startling in European agriculture. In 1986 the EC was a net importer of all main agricultural products, by 1987 it was a net exporter of most. For example in 1968 the EC was 86% self- sufficient in cereals, by 1987 this figure was 119% (A Common agricultural policy for the 1990s, p54). This output increase was accompanied by a large fall in agricultural employment so productivity gains were enormous. Ironically while security of supply is an aim of policy, now the expansion of output was running into a wall of inelastic demand. The OECD estimate that demand for food grows at 0.5% per annum in Europe (OECD p193) so extra production could not be consumed domestically. Security of supply and productivity growth can no longer be considered as practical objectives of the CAP.

Secondly there was the aim of stable prices for consumers. Obviously this aim is quite incompatible with the aim of raising farm incomes when a price support mechanism is in place. In practice legislators have treated the farm incomes aim as being more crucial so the large welfare losses borne by consumers due to the CAP were not a big issue in any debate on reform.

Finally there appears to have been a manifest failure in the aim of maintaining farm incomes. The average real income of a European farmer in 1988 was below the level of the mid 1970s. One possible explanation is that a substantial part of the benefits of support packages has been capitalised into land prices. Another criticism of the policy with regard to incomes is that price support is more beneficial to larger farmers than their poorer counterparts. For instance a simulation exercise presented by OECD on German agriculture showed that the long-run impact of maintaining agricultural prices 10% above their equilibrium level is to increase the index of intra-sectoral inequality by nearly 40% (OECD p191 1987). Thus the CAP appears to have both failed to narrow the income gap between farmers and non-farm workers and also to have increased inequality amongst farmers. However it is doubtful that this depressing result generated the pressure that led to reform in the late 1980s. It is more likely that it was the combination of a financial crisis and some serious negotiations with the EC's trading partners which finlly brought the Community to it's senses.

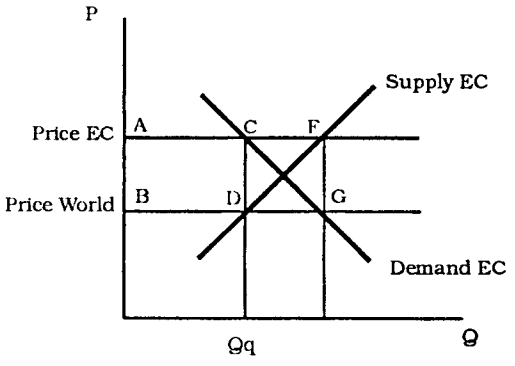
The combination of high guaranteed support prices with increases in yields resulted in Community agricultural support expenditure growing rapidly, exceeding available budgetary funds. Spending on the CAP has risen from 11,300 ECU in 1980 to over 26,000 ECU in 1988. The price-supporting policy swallowed 66% of the total EC budget in1987 (Australian Bureau of Agricultural Economics p4).

The financial cost paid by EC taxpayers is only part of the total cost of the CAP. The deadweight costs visible in diagram(1) affect the citizens of the EC adversely. Winters argues that market interference in agriculture diverts resources from industry and services, reduces EC competitiveness in manufactures and reduces aggregate employment. He feels that deadweight losses of up to 1% of GNP are plausible in the EC (Winters p47).) In 1987 an inevitable financial crisis arose. This crisis was precipitated by rising agricultural

expenditure, the enlargement of the EC to include Spain and Portugal (two relatively poor agriculturally-based countries) and the inability of member countries to agree on a method of raising their contributions to the EC budget. In February 1988 the financial problem was resolved- extra funding was agreed for the EC budget and a parallel agreement was that the agricultural budget would be stabilised. Thus reform of the CAP became mandatory.

A final influence which has prompted reform and will continue to do so to a larger extent in the future, is the effects of the CAP on world food markets and on other food-exporting countries. Due to the costs of intervention storage the Community has tried to reduce surpluses by exporting them to non-member countries. Increases in exports have been quite phenomenal, for instance between 1973 and 1985 cereal exports increased by 150% (A common agricultural policy for the 1990s p56). As modelled in diagram (1) large export increases exert downward pressures on world prices. World prices reached an all-time low in 1987. It is to be remembered that other industrialised countries (such as the US and Japan) contributed to this fall by their agricultural support policies. By the mid-1980s the world markets for food products had become totally destabilised. It is hardly surprising then that the current round of GATT negotiations are centred on agricultural trade. This round must end this year and the EC will come under very strong pressure from the US and the Cairns group(Australia, New Zealand and other food-exporting countries) to make significant reductions in it's level of price support.

I now shall outline the broad thrust of the reforms which have been introduced up to now. The first major indication that costs would not be allowed to veer completely out of control was the introduction of a milk quota scheme in 1984. The Community had reached self-sufficiency in this area in 1974, supply growth over the next ten years was 2.6% per annum as against a 0.6% growth in demand for dairy products annually (A common agricultural policy for the 1990s p62). The guaranteed quantity was initially set at 99M tonnes for the EC, 5M tonnes less than production volume in the previous year. The quantity was then apportioned among the member states, which assigned quotas to their farmers. Production in excess of quota is subject to a large cut in price, making the excess production uneconomical. As a result of the quota system, milk production since April 1986 has declined by some 5% and intervention purchases of dairy products were reduced by nearly 10% in 1988 alone. Since originally quotas were at levels that exceeded EC demand, the Community has bought back a portion of them. Diagram (2) shows how a quota can be used to reduce production to the level of demand at a particular price. If this price is the same as in the intervention-type system of diagram(1), Producer surplus has now increased by area ABCD over it's free market level while consumer surplus has declined by ACGDB. Thus there is a deadweight loss of area CDG. Therefore farmers do not gain as much, consumers are unaffected but large cost savings accrue to the EC taxpayer. In this way a quota can effectively tackle an oversupply problem but a deadweight efficiency loss still remains.



In February 1988 a group of measures were introduced and known collectively as the 'stabilisers' package. The effects on the price support policy are outlined below. Since 1988 guarantee thresholds have been set for many

commodities. These are maximum levels of production for which 'normal' EC support prices prevail. Budget stabilisers have been put in place whereby if production exceeds the guarantee threshold, the level of support, and hence the price, are reduced automatically. Furthermore for some commodities, such as cereals, a co-responsibility levy is raised from producers to cover some or all of the costs resulting from production of a commodity in excess of a specified quantity. In general maximum guaranteed quantities reflect current EC output. For example, in the case of cereals, the choice was 160 tonnes- a figure below the production level in 1988 but above that of the previous two years. If this figure is exceeded, intervention prices are cut by 3% in the following year irrespective of the extent of overproduction. If production remains above the maximum guarenteed quantity for several years, the price cuts become cumulative. Similar arrangements were adopted for oilseeds and protein crops and variations have since been introduced for most commodities. These measures then aim to reduce price as well as quantity. If price reductions are cumulative then overproduction in one year leads to cost savings in future years. Farmers are less well off than in the past because price has fallen. Consumers of course are better off. Since the measures may reduce price and quantity, taxpayers will be richer. There are also positive benefits for food-exporting countries.

Implemented to complement the stabilisers package has been a programme of set-aside. Set-aside involves payment of an aid per hectare by the Commission as compensation to farmers who take arable land out of production for a minimum period of five years. To qualify a farmer must leave at least 20% of his land fallow, plant it with forestry or make use of it for non-agricultural purposes. Set-aside has been unambiguously introduced as a method of reducing surplus production. The savings from the guarantee section of the CAP should more than offset the cost of the payments to participating farmers. Low takeup rates will probably mean that the effects of the scheme will be marginal.

The main criticism of all these reforms is that they have been based mainly on administrative rather than market mechanisms. Price support continues at levels far above international prices. Any reduction in output due to the reforms has been small. The efficient way of reducing production is to reduce prices significantly. This option has been ignored in favour of more roundabout supply constraint schemes.

Secondly most of the maximum guaranteed quantities are a reflection of current EC production levels and therefore will consolidate the present EC trade pattern. Thus the agricultural trade issue has yet to be seriously addressed and it is likely that more far-reaching reforms will be necessary once the present Uruguay GATT round is completed.

Finally there are possible alternative systems of achieving the aims of CAP which I will now outline briefly- these being direct income support for farmers and the extension of the structural funds. Either one or both together could replace entirely the current price support system. Structural funding is used to modernise agricultural production in the Community. As a system it could be much more equitable than price support in that it would be concentrated on the poor, backward farms of Spain, Portugal, Greece and Ireland. Structural policy need not create any new incentives to production. Aid to individual farms can be granted mainly for investments which help reduce production costs, improve living and working conditions and direct agricultural production along new lines. As such it would aid those poorer farmers who have failed to gain significantly from price support. As production would be at free market levels the costs generated by EC surpluses both domestically and internationally would not arise.

A second possible system is that of direct income aids to farmers. In 1973 the Commission put forward proposals for the reform of the CAP in which direct income support was considered, and rejected, on three grounds. Firstly it was argued that it would impose substantial administrative costs for member governments. Secondly it would involve too heavy expenditure of public funds and thirdly that it would hold up structural improvements. These arguments are not really valid because all governments have social assistance programmes in place anyway which could be used for administration and while direct income

aids would call for increased public funds, the welfare costs in terms of higher costs to consumers would not then occur. ie consumers would gain but taxpayers would lose. Farmers would also gain in that the deadweight costs associated with price support would not exist and resources would be allocated more efficiently. However the farming community does not like direct income supports. Politically they are difficult to justify as the transfer from taxpayers is visible. It all may have the appearance of charity and that many farmers would be loathe to accept. Finally larger farmers would not do as well under this scheme and they tend to dominate the farm lobby. However this distributional impact is an advantage of the strategy. Direct income support could have a varying effect on output but it is unlikely that output would be radically different from it's free market level.

An important point about both these possible systems is that because interference in the workings of the market is minimised efficiency losses would be so much lower than they are at present.

A further point is that losses to farmers would not be as great as it may appear. It must be remembered that if the EC liberalised its agricultural markets it would have a positive effect on the world price. What is more likely is that the EC would liberalise it's markets as a result of GATT agreements and so all countries would liberalise simultaneously. If this eventually was to come to pass, the world price would rise by more than if only the EC was to liberalise. Tyers and Anderson estimate that if all countries did liberalise that this would lead to a 33% increase in the international price in the medium term (Tyers and Anderson p201). Therefore phasing out price support would have positive benefits both domestically and internationally.

My conclusion is that the administration of the CAP has been somewhat shortsighted. The CAP remained largely unchanged while it manifestly failed to achieve its aims and while its costs ,both in terms of finance and welfare ,spiraled. Real reform wasn't introduced until it was forced due to financial crises and external pressure. Further more radical change may yet be necessary. With these considerations in mind, more research is needed into alternative means of achieving the aims of CAP other than price support. The potential benefits which could arise from change makes the survival of price support into the future rather unlikely.

Paul Devereux

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European Monetary Union

When the Treaty of Rome was signed in 1957, its six original signatories - France, Italy, West-Germany and the Benelux countries - aimed to lay the foundations of an ever closer union amongst the people of Europe. A Monetary Committee was set up in 1958 to consider the possibility of a common monetary policy. Walter Hallstein, the first EC president, held the view that a common monetary policy aimed at achieving stability would be more than a touchstone for the Community; it would be a fundamental requirement.

Today, more than 30 years after the foundation of the EC, neither complete monetary union nor a single monetary policy for the Community have been achieved. Britain has yet to join the Exchange Rate Mechanism of the EC, and remains very sceptical about any moves leading towards monetary union.

This essay aims to analyse and assess the consequences of European Monetary Union (EMU) as implied by the recent Delors Report. Firstly, the definition of monetary union will be examined. Having considered the benefits and costs associated with monetary integration, I propose to evaluate what is the optimal level of monetary integration for the community.

According to the Delors Report, EMU will involve the operation of a single market, irrevocably fixed exchange rates and the co-ordination of macro-policy. EMU will necessitate both positive integration (for example the establishment of common policies, the the creation of new institutions such as a European Central Bank System, etc.) and negative integration (for example the removal of barriers to the movement of goods, labour and capital).

This is not the Community's first attempt at monetary union. Following the Werner Plan in the late 'sixties, the EC decided to set 1980 as the date for achieving monetary union. The *snake* system was adopted in 1970, which allowed EC currencies to fluctuate within 2.5% margins. The snake was replaced by the European Monetary System (EMS) in March 1979 in a period characterized by high inflation and unemployment. The objective of the EMS was to create a zone of internal and external monetary stability in Europe that would better withstand the effects of a highly unstable and weak US dollar. The EMS involves the pegging of currencies to the Deutschmark. The Deutsche Bundesbank was somewhat reluctant at first to allow the DM to be used as a reserve currency, for fear it would lead to inflationary pressures in the West-German economy. The European Currency Unit (ECU) was created at the same time as the EMS. It is composed of a fixed amount of European currencies, whose shares are proportional to GDP, trade performance and quotas. Although it has enjoyed moderate success with private investors and companies (the French civil engineering firm St. Gobain draws up its accounts in ECU's) its role as a numeraire in exchange rates has only been symbolic. Changes in bilateral exchange rates have been crucial in realignements.

The Delors Report proposes to achieve EMU in three stages. The first one is the initiation stage. It will involve a greater convergence of economic policies, full participation in the EMS of all member states, the complete liberalisation of capital and the removal of obstacles to the private use of the ECU. The second stage will consist of establishing a legal base for EMU. This phase will require amendments to the existing Treaty and the creation of a European Central Bank System. The third stage will bring about the irrevocable locking of exchange rates. Monetary policy will be handed over completely to the European Central Bank System (ECBS). Following this, the establishment of a single currency would be a mere formality.

The principal aim of EMU is to increase the scope and ambition of the Community. There are many benefits arising out of monetary union. Firstly, it will provide an effective means of controlling inflation, via a mechanism of interventionist policies directed by a ECBS. Secondly, stability in exchange rates

would be guaranteed, which is an essential requirement for the existence of a genuine single market. The fixing of exchange rates can only be achieved once monetary stability has been achieved first. It is an evolutionary rather than a revolutionary process. Thirdly, monetary union will lead to economies of scale in the amount of reserve holdings actually held by central banks.

However, successful monetary union depends on several factors. EMU will rely heavily on a set of rules, but its proper functioning will depend primarily on the willingness of partner countries to satisfy the requirements underlying stable exchange rates, just as the EMS does today.

The realisation of EMU will also involve the transfer of monetary policy decisions from a national to a European level, where they will be conducted by a non-elected body. This can be best achieved by a body free of political interference. The highly politicised EC has always tended to opt for averages and compromises. However, this will not work in the case of monetary policy. A European Central Bank must not foresake long term anti-inflationary policies for the temptation of election catching. As William McChesney Martin (former Chairman of the Fed.) put it: "The role of a Central Bank is to take away the punch-bowl just as the party gets going". In order to be efficient, the ECBS will need to have a monopoly on the creation of money. Otherwise, it would be a tiger without teeth.

Most European countries are somewhat sceptical about the creation of an ECBS. In order to be successful, it should lead to a situation in countries with stable currencies that they remain stable; for countries experiencing an eroding of their currency, it should lead to a situation of stabilisation.

Many countries are worried bout the loss of political autonomy implicit in EMU. The British argue that in order to achieve EMU, there is no need to surrender the amount of national sovereignty specified by the Delors Report. Another pretext for Britain not joining the EMS lies with the government's preoccupation with market forces rather than interventionist policies.

With EMU, seigniorage will no longer be available as a fiscal stabilisation tool. It involves the creation of money to erode debt. The loss of monetary independence will also have regional effects, which could be quite severe in the case of Ireland. The option of devaluation, which has positive output and employment effects under certain conditions will no longer be available to Ireland. It has been argued that such adverse regional effects could be cushioned by the establishment of budgetary mechanisms. However, there is no mention of such mechanisms in the Delors Report.

Monetary Union as defined in this essay, in my opinion, is highly desirable from an economic point of view, notably for its implications for stabilisation, low inflation and uniformity. However, there are transitional costs involved. They will tend to be short-term and will be largely borne by the private sector, whereas the benefits arising from monetary union will be spread more widely and will only materialise in the long- run. The success of EMU depends to a large extent on the willingness of governments to establish an ECBS, to foresake part of their political autonomy and not to counter Community monetary policy with national fiscal policy. There is no doubt that the outcome of EMU will determine the structure and future of the EC in times to come.

Joe M Smyth

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Fiscal Discord & 1992

INTRODUCTION

This paper provides a cursory overview of the current initiative to remove fiscal barriers between EC nations. It is divided into four sections. The first of these examines the rationale behind the programme to bring about fiscal harmonisation. Section two looks briefly at some of the difficulties which have been encountered during the implementation of this programme. The third section examines what progress has been made. Finally,section four adopts a longitudinal perspective in high-lighting the significant role that confidence and expectations will play in determining the ultimate outcome of the programme.

WHY FISCAL HARMONISATION?

To ensure the proper operation of the aggregate market envisaged by the EC in its 1985 White Paper, 'Completing the Internal Market', all factors which cause distortions of competition and artificial price differences between Member States need to be dealt with. These factors can usefully be classified under the headings of physical, technical, and fiscal barriers. It is with the third of these that this paper is concerned.

As Colchester notes, 'Customs posts are, above all, a matter of tax'(1988:12). Whenever goods are moved from one country to another, they are elaborately documented at the border so that the relevant fiscal authorities can collect the VAT and excise duties to which they are entitled. These frontiers create debilitating compliance costs and hence promote inefficiency. The Commission estimates the opportunity cost of customs formalities to be close to 12 billion ECU (IR£9.3 billion) per annum. This is why, as Colchester notes, of all the problems of creating an open market, the tax issue was the one on which the White Paper lavished most attention.

If fiscal frontiers are to be removed, we must ask ourselves what purposes they serve, how many of such purposes need to survive, and how those that need to survive can be otherwise achieved when frontiers are removed (Periodical 4/1987:49).

Fiscal frontiers serve two main purposes. Borchardt writes that these controls serve 'to ensure that less heavily taxed imports which could undercut home products gain no unfair competetive advantage'(1987:35). Secondly, they have a significant role to play in the fight against fraud and evasion.

Indirect taxes act as a levy on all commodities that enter consumption. The present system of indirect taxation in Europe is designed to ensure that this is what occurs when goods are traded internationally. Suppose that Irish goods are exported to Germany. It is the German consumer who should bear the tax, not the Irish manufacturer. Under the current system the desired result is achieved by the Irish government refunding the tax to the Irish exporter, and the German customs authorities collecting the tax from the importer. The importer then passes the duties down along the tax line to the final consumer. The operation of this system depends crucially on the existence of fiscal frontiers.

The scope for fraud and evasion in the absence of frontier controls is obvious. If goods were not checked at borders, it would be easy for traders to invoice goods as zero-rated for export. They could then sell them at home and either undercut their competitors or pocket the tax element themselves. However, the presence of fiscal frontiers ensures that all goods that are zero-rated are accounted for.

Thus it is clear that, although the existence of frontier controls promotes major inefficiences,their absence would promote even greater distortions under the present system of taxation. Hence the desire for fiscal reform and harmonisation.

The EC White Paper proposes that sales and purchases across national

borders be treated in exactly the same way as domestic sales and purchases. Far from being a radical proposal, this is exactly what was set out in article four of the very V.A.T. directives of 1967.Three of the major perceived advantages of such a procedure would be:- (i)International trade would soon become a natural way of expanding indigenous business.(ii)Fiscal administration for traders and national authorities would be greatly simplified, and compliance costs significantly reduced.(iii)A major incentive for fraud and evasion - zero-rating of goods for export - would be eliminated.

However, such a system would not of itself allocate tax revenues correctly between member states. It would also leave scope for other forms of fraud and/or evasion besides zero-rating, especially unregistered trading. `In the absence of any frontier controls, significant price differences resulting from differences between indirect tax differences on each side of any border would provide an irresistible incentive for those in highly taxed countries to provision themselves in the low-tax country next door' (Periodical 4/1987:52).

In answer to the first of these problems, the Commission proposes the establishment of a clearing mechanism, such as that operated by the banks and airlines. Balances could be settled between nations on a daily, weekly or monthly basis.

In answer to the second problem, the commission proposes the reduction of disparities between member states' tax rates to the point where they no longer provide an incentive to the diversion of trade. Note that this does not necessarily entail complete uniformity. The experience of the U.S., where the spread of sales tax rates across all states is 9%, shows that contiguous states can maintain differences of up to 5% without significant distortionary effects. This was the rationale behind the decision by Cockfield to aim for a spread of 5% in the White Paper targets for the eventual VAT levels.

Why was it that the Commission decided to pursue pre-emptive harmonisation rather than to allow market forces bring rates into line? One reason was that the Commission feared that those countries with high rates would refuse to lift their fiscal barriers because of the large revenue loss that such action would entail. This issue of revenue loss is returned to below, but it should be noted that in going for `active' harmonisation, the Commission made a departure from its general 1992 tactic of `getting members committed to a simple-sounding goal, chivvying them towards it, and letting them cope with the consequences later

But in practice the removal of fiscal barriers has proved to be the thorniest of all the proposals which Lord Cockfiekd's White Paper contained. Colchester was prompted to write that, `There is no issue like tax to show how the good intentions behind 1992 are running into the sands of sovereignty'(1988:12). What are the difficulties which have been encountered? In regard to VAT, part of the problem is theoretical. The governments of the E.C. insist on collecting VAT on the full value of something acquired on their territory - even if most of its value was added elsewhere in Europe. This makes the market much harder to unify. But what is perhaps more significant is, as was already mentioned, the potential revenue loss facing those governments in the Community which levy the higher rates of VAT. The Irish government is a case in point. Already it and its Danish counterpart have `illegally' restricted the standard EC tax-free allowance of 350 ECUs to genuine' travellers. Finance Minister Albert Reynolds has indicated that the harmonisation of EC tax rates could cost the Irish exchequer IRú600 million, equivalent to 3% of GNP. The corresponding figure for Denmark has been put at 6%.

The divergence in member states' excise rates has proved to be an even greater problem. The Commission came up with a list of fixed compromises that would alter the price of alcohol, tobacco and petrol significantly. Various countries have posed objections to this list. For example, the British government feels that such compromises constitute bureaucratic meddling, and insists that it

will maintain its own high rates on drink and tobacco for health reasons.

This reflects the fundamental basis of excise duties. There are certain goods for which the individual consumer's preferences may not reflect what is actually best for him or her (e.g. alcohol, tobacco). Levying heavy excise taxes on these goods is, thus easily justified. The problem arises when different governments adopt divergent views regarding what is an appropriate excise levy on a particular good.

However, this argument concerning the social consequences of reductions in excise duties is only half the story. Some goods on which excise taxes are levied,such as petrol and motor vehicles,obviously do not manifest the same consumer welfare characteristics as, say, tobacco and alcohol. Ironically it is these 'other' goods which are proving to be more of a stumbling block. Objections from France and Italy to the introduction of a common excise duty on motor vehicles caused the plans to be dropped in 1989.

Other difficulties have been encountered. The clearing-house plan is viewed by many to be untenable. Both France and Britain favour more reliance on market-driven convergence. Furthermore, a community-wide trade policy towards the rest of the world, which would be the inevitable consequences of a custom free Europe, would directly contravene article 115 of the Treaty of Rome, which allows individual member states the right to protect their own trading interests. This implication has to date been largely sidestepped, underlining the Commission's admittance that, so far as 1992 is concerned, `Foreign trade is an unopened book' (Colchester,1988:23). Finally, the real motivating force behind fiscal harmonisation, Lord Cockfield himself, has now stepped down to be replaced by Mrs. Scrivener, a capable tax commissioner who nevertheless lacks the dogmatism and charisma of her predecessor.

It is these and other issues which justify some of the current cynicism about 1992.

A CAUSE FOR OPTOMISM

But only some of it. At the current juncture, it is still unclear whether EC citizens will be able to bring as much as they want across community borders by 1992. The implementation of a completely fraud-proof VAT system has been postponed until at least 1996. And individual governments are manifesting a certain tardiness in implementing those proposals which have been adopted concerning the internal market.

Yet progress has been made. As Flynn notes:

`The past year was one in which the relentless momentum towards 1992 managed to sweep aside many of the rules which inhibit free and open competition' (Irish Times, 1989).

The recent agreement by EC foreign ministers on 18 December 1989 provides a good example. It was decided that a watered down version of the Cockfield proposals would be adopted. The new accord proposes that a standard VAT rate of 14% be achieved by 1991. No country with a standard rate in excess of 25% will be permitted to sanction an increase in this. Those countries with a standard rate below 14% will not be compelled to reduce this any further. In addition, it was agreed that those countries which stand to lose substantial indirect tax revenues due to harmonisation, are to be compensated.

The Commission is also very much aware of the delayed-response syndrome which afflicts some governments once they have agreed to implement certain measures. The Commission's report for 1989-1990 states that `the completion of the internal market is proceeding rapidly ...[However] Governments must set up the introduction of these decisions into their national legislation if the decision-making process is not to be seen as losing momentum' (quoted by Conlon in Business and Finance Nov. 9 1989). Of course, recognition of a problem does not imply an imminent solution.

On the home front, the standard VAT rate was reduced from 25% to 23% in

the recent budget. It remains the highest standard rate in the Community, just one point ahead of the Danish rate. However, the change still counts as a move in the right direction.

Finally, some of the criticisms of the Commission's proposals are ,themselves, untenable. For example proponents of more reliance on market-driven convergence, including the British and the French, are simply shirking the issue. Ultimately, it is the government of each country which will have to sanction changes in indirect tax rates, and whether this occurs in one great community-wide levelling, or piecemeal, country by country, is academic - with the exception of the situation in which a strategically planned VAT reduction might garner valuable support in the run-up to a national general election.

Hence, it appears that the doom and gloom predictions of some commentators should be tempered.

A LONGITUDINAL PERSPECTIVE

However, it is ultimately by adopting a more long-term perspective that the current 'Eurphoria' can best be understood. Such a longitudinal perspective places 1992 firmly in context.

Following a decade and a half of no more than marginal progress and indeed perhaps overall regression, the EC suddenly came alive in 1985. This surge of activity can be paralleled to the dynamism of the community in its formative days. Then a number of factors combined to blunt enthusiasm. Despite the good economic intentions of the community members, failed attempts to move the EEC forward bore adequate witness to the fact that more than good intentions were needed.

The Fouchet plan was mooted in 1961, but it and its successor died because they were too direct in their attempts to compromise the sovereignty of members' (Colchester,1988). The 1970 Werner plan for Economic Monetary Union also died a quick death. Subsequently, an ambitious programme for 'European Union' proposed by the Belgian prime minister, Tindemans, foundered on the sharp rocks of nationalism. In contrast to the heady optimism of the 1960s, a mood of despondancy was palpable on the floors of the Berlaymont building during the 1970s and into the early 1980s.

In the same way, the current 'Eurphoria' may be transigent. Efforts to bring about fiscal harmonisation could easily founder. This is not to adopt a cynical attitude towards 1992. Indeed the opposite is the case. The confidence which the community has built up over the last five years is now its most valuable asset. For it is when confidence is high that changes take place, in spite of the difficulties which exist.

CONCLUSION

In this paper, the current programme for E.C. fiscal harmonization has been summarily reviewed. Section one examined the reasons why harmonisation is considered desirable. Section two discussed some of the difficulties which the programme has so far encountered. Section three reviewed progress to date. Finally, ection four adopted a more long-term stance.

It may be concluded that the ultimate fate of harmonisation will depend on the degree of confidence and the level of momentum which can be sustained throughout the continent. From this perspective, one of the greatest dangers lies in pessimistic predictions, which, through their impact on confidence, may become self-fulfilling prophescies. As Colchester notes, 'So far, the crash-programme to complete the great market has shrugged aside an impressive number of fatal trials predicted for it'(1989:24). Its ultimate success or failure will depend on its ability to continue 'shrugging off' such trials.

Paul O'Connell

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The Labour Market & Welfare Induced Rigidities

INTRODUCTION

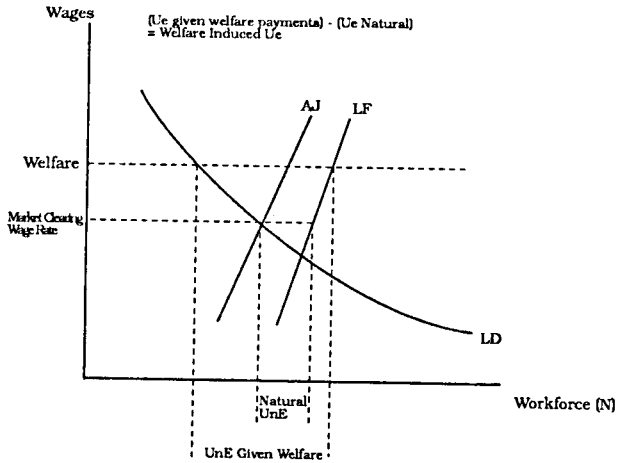
As a small open economy with, therefore, in at least all traded sectors, a theoretically given wage rate, Ireland has been dogged by persistently high rates of unemployment for the past 10 years, and especially so since the inflation conscious Germans have asserted their authority over European economic issues. So, is a high level of unemployment an inevitable consequence of technological advancement and increased productivity, or can it in some way be designed out of the system?

The purpose of this essay is to explain why Ireland has persistently high levels of unemployment. Attention will be focused on our social welfare system and its complexity as the major cause, and one major alternative will be suggested - the Basic Minimum Income - as a more rational approach to social welfare.

The Concept of the Basic Minimum Income is, at its theoretical level, delightfully simple, as will be shown. Its implementation, and especially the necessary transition period may not be so. However, this difficulty should not take away from the overall concept. Where possible, this essay will be kept free of specific references to Ireland, as the concept is capable of implementation under any social system.

THE WELFARE TRAP

In an effort to explain how a significant proportion of Ireland's 18% unemployment level is caused by our social welfare system, there are two basic assumptions which will be made. Firstly, reasonably, many of those who are currently registered as unemployed cannot hope to attract the average industrial wage due to a lack of education and/or scarce skills. Secondly, and perhaps more controversially, work in itself is a utility provider, and a person will work provided there is no direct economic loss involved in doing so.



It is a combination of these two assumptions that lead us to our problem. Under our current Social Welfare System, and increasingly so given successive governments' "generosity" to the long term unemployed, it has been argued forcibly that for low skilled people the replacement ratio, defined as the ratio of welfare benefits to earnings, is in excess of 1 when monetary and non monetary

benefits are included. One must clearly include both monetary and non monetary benefits accruing to welfare recipients when calculating replacement ratios. The difficulty in giving a monetary measurement to free health care, education, fuel etc. is real, but scarcely a reason for ignoring them in calculations. They still, after all, represent command over resources. The crux of the matter is that many of these benefits, and all of the monetary allowance, is lost on taking work. Hence, for a low skilled person, the real difficulty is one of finding work which wil pay in excess of the monetary value of the welfare benefits lost. Added to this must be travel, clothing and food expense directly incurred in working.

This brings us to what is today called a Welfare or Poverty Trap, and which is no more than a classic rigid inflexibility in the labour market.

AJ: Those accepting jobs. LF: the labour force. The horizontal distance between AJ and LF represent those who for reason of job search or for welfare registration purposes are registered as unemployed. LD: labour demand curve. Ue: the level of unemployment.

IS THERE A PROBLEM?

Well, some would argue that there is not. The very existence, it is claimed, of high levels of unemployment, allows employers to resist wage increases by pointing to a readily available workforce who will take work at the going wage rate. This is a spurious argument. Given the strength of unionised labour, especially in the non-traded public sector, and linked pay rounds carrying over into the traded sector, this argument carries little weight. Furthermore, this argument ignores the differing skill requirements of employers. With an internationally mobile labour force, for example in the construction industry, one can see that available wages in, say, London, must be approximated during periods of investment expansion at home. Hence Dr. Garret FitzGerald's recent call for tax breaks for returning construction workers in order to avoid an inflationary pay round at home due to competition for a diminished labour resource.

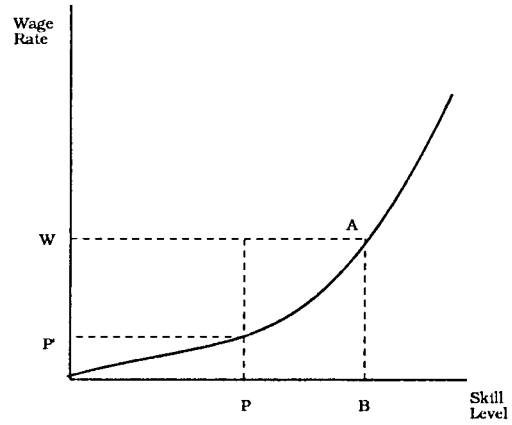
So, there is a problem. Essentially, there is an enormous economic cost involved in allowing our present social welfare system to continue. This comes in three main ways. Firstly, through the ouput lost through the inefficient use of the labour resource. Secondly through increased labour costs due to high levels of taxation needed to maintain the system. Thirdly, and most often forgotten, through the hysteresis cost of an erosion of human capital due to a loss of self esteem, and in the long run, a move away from an enterprise culture towards a culture of social dependency.

SOME ALTERNATIVES.

In a modern world, the Malthusian solution of allowing a life sustaining labour market clearing wage rate evolve through death by starvation and thus a shift left in the labour supply curve is hardly arguable. The current practice in Ireland, characteristically, is a piecemeal "fiddling around on the margin" approach. Family income supplements, whilst at least a recognition of the existence of the problem, are not effective. The level of replacement supplementary income is too low, and through its complexity, the take up rate is miniscule. Allied to this is the apparently irresistable temptation of successive Ministers for Finance to make the situation worse by allowing proportionatly more benefits to the long term unemployed, far outstripping inflation and average pay increases, and thus raising yet further the replacement ratio faced by work seekers. Clearly a fresh approach is needed.

THE BASIC MINIMUM INCOME - A SOLUTION?

Below find a graphical representation of a labour market, showing the relationship between the amount of skill possessed by the individual worker, and the market wage rate this level of skill will attract.



A worker, and all workers with greater than the level of skill indicated at 'B' above, will take work given that wages in excess of the welfare rate can be earned, and that work, in itself, is a provider of utility. Clearly, the cost to society of preventing an individual worker, and hence all workers with skill level less than 'B', from taking work is

(Number with skill level < 'B') * (OW)

This cost can be thought of as the area OWAB. If an employer willing to pay OP' for a worker at skill level P was operating in a free labour market, he would be in a position to offer employment. Quite simply, what the Basic Income proposes is that such an employer would pay OP', and the state, instead of paying OW to keep the potential worker idle, would now pay P'W and gain a saving in welfare cost and a certain amount of output.

Aggregating, the gain to the state can be thought of as the area OAB. Welfare payments, previously represented by OWAB are now OWA . The area OAB, further, can be thought of as representing extra output, previously lost. Under this analysis, the gain to the state, and the individual, is clear. Arguments that the Basic Income System would cost too much are groundless.

SOME PROBLEMS.

Clearly, we cannot expect the state to "top up" wages on an individual basis. The cost in administration alone would be enormous, as would the temptation on employers to understate the amount they are willing to pay for the services of the individual worker. The economic rationale outlined above leads to the practical concept of the Basic Minimum Income.

The proposal envisages that the state would pay everyone, at a level determined only by age, a basic minimum income whether they are employed or not. Electronic technological advances, especially in the area of funds transfer, makes this feasible at reasonable cost. The individual is then free to seek extra pay through employment, or to maximize employment prospects through further education or training, without being hindered by loss of income. The system would be financed by higher gross income taxation. It should, at this point, be stressed that the net amount payable by the state in welfare payments, and hence the taxation liability on society generally, would be *less* than as under our present system.

THE ADVANTAGES OF A BASIC INCOME SYSTEM.

The main advantages of such a system lie in economic efficiency. As the system involves releasing previously welfare bound workers into the labour

market proper, these benefits are clear. Currently depressed, labour intensive industries would be able to find employees willing to work without having to match social welfare rates of payment.

Some arguments against such a system are put forward, and whilst it is impossible to anticipate them all in this essay, for completeness some of the more common are answered below. A fuller debate would be best served in the form of a follow up essay perhaps in response to a critique.

The arguments against the Basic Minimun Income System lie chiefly in costs and incentives to work. In answer to this one should be reminded to compare like with like. To say that the system would be expensive to operate is indeed true, but this is to ignore the enormous cost involved in operating our current system. It is important to remember that targeting of benefits costs money, in means testing, checking up on claims for qualification purposes, and through the employment of large numbers of civil servants as administrative staff. Arguments concerning the level of Public Sector Share can be dismissed outright. If the State does not have control over the spending of the money involved in welfare payments, it can hardly be argued that it is increasing its share of control over National Output. A more rational approach to calculating Public Sector Share lies in deducting from Public Sector expenditure and revenue accounts, cash payments to the Private Sector.

A major argument lies in the incentives to attempt to defraud the state. Whilst it may be true that the possible benefits to the individual from not declaring earned income are significant, they are surely not significantly greater than they are today. The problem becomes one of tax evasion from one of welfare fraud. The proposed system should not be expected to solve all revenue\welfare problems at a stroke. The economic efficiency benefits, alone, tend to recommend its further study and debate.

CONCLUSION

In this essay it has been argued that due to the operation of our Social Welfare System, a rigid inflexibility is prevalent in the Irish labour market. As a direct result of this inflexibility, significant inefficiencies are reducing the potential output of the state.

It has been shown that a fresh approach to the social necessity of a state welfare system, through a Basic Income System would result in vastly improved pareto efficiency.

What must be avoided, on this issue as on many others, is allowing the idea to be designated "left wing", and thus consigned to the scrapheap. For too long, emigration has been used as a safety valve, allowing policy makers ignore the structural inadequacies of our administative system. Thus by 'benefit' of this historical quirk, when others move on, Ireland seldom sees the need. However, despite emigration, unemployment levels remain stubborn. If it doesn't work, to misquote US Senator Robert Byrd, maybe we should fix it?

Billy Stamp

Poverty in Ireland

INTRODUCTION

The poverty debate.

In the weeks prior to the 1989 budget the issue of poverty in Ireland became the subject of considerable public debate . This was prompted by the publication of a report by the E.S.R.I. and the Combat Poverty Agency (C.P.A.). The report was based on the results of a survey of a sample of households, conducted by the E.S.R.I. and partially sponsored by the C.P.A. It was on the basis of this report that the somewhat alarming statistic that one third of the Irish population were living "below the poverty-line" gained common usage in public debate, and became the principle argument of those demanding a sizeable rise in social welfare payments.

The E.S.R.I. results were, however, severely criticised by some economists on methodological grounds and, unfortunately, the policy dicussion became bogged down in theoretical wrangling. A suitable definition of poverty (and a method of measuring it) are prerequisites for informed policy decisions in this area, yet a year later these issues have not yet been resolved.

The purpose of this paper is to examine various definitions of poverty in Ireland. In doing so I do not intend to merely reiterate the C.P.A.\E.S.R.I. Vs Barrett et al debate of 1989, though much of the material covered here was subject matter in that dicussion. I intend rather to return to first principles to establish if possible a definition of poverty. The discussion is primarily of a theoretical and conceptual nature. As the title sugusts, it focuses primarily on the Irish situation, though any conclusions are most likely to be applicable to any O.E.C.D. country.

WHAT IS POVERTY ?

The problems of definition

Most of the literature on poverty accepts that there are two ways of conceptualising it. We think of poverty in either absolute or relative terms. Since the measurement that is eventually chosen depends on our definition, which in turn depends on our conceptualisation, then it follows that understanding the differences between absolute and relative poverty is of the utmost importance.

The absolute concept of poverty is the more traditional of the two, and tends to dominate in the popular mind. Poverty is seen as having less than a certain absolute level of income. In terms of a "poverty-line ", those whose command over resources does not permit them to consume a basic amount of goods and services are below the poverty-line. The U.S. government defines poverty in absolute terms. The amount of income necessary to provide a nutrionally adequate diet , multiplied by three to allow for other expenditures, is the income level below which a person or household is deemed to be in poverty.

Absolute definitions of poverty may be suitable in L.D.C.s, where starvation and malnutrition are serious threats. Their applicability to the western world has, however, been severly questioned. The reason for this is quite simple. As Galbraith puts it, since the second world war the western world has enjoyed "a time of great and unprecedented affluence"....exceptional...."in the whole span of human existence". This increase in the general level of material wealth has led to demands for a more equitable division of the spoils. With such unprecedented wealth it was no longer acceptable to say that a person who wasn't starving wasn't, of necessity, in poverty. This led to a relative concept of poverty.

Townsend, one of the pioneers in this movement, defined poverty as follows: "Individuals, families and groups in the population can be said to be in poverty when they lack the resourses to obtain the type of diet, participate in the activities and have the living conditions and amenities which are customary or at least widely approved in the societies to which they belong."

Such a definition appears to add considerably to formalising our intuitive ideas of poverty. It means that every society has a different definition of poverty, depending on its circumstances. One example of a measure of poverty using relative criterion is that used in the C.P.A.\E.S.R.I. report. It calculated the number of households with incomes of less than 60% of average (mean) household income.

We are thus faced with two contrasting conceptions of poverty. Both are however, open to considerable criticism. As we have seen, the absolute measure of poverty has little regard for the particular circumstances of each society. It makes inter-societal comparisons very difficult. For instance, a house might be regarded as a necessity of life in Ireland, and anyone lacking a house or the use of a house would then be considered poor. In other societies, a tent is deemed to be perfectly adequate as a permanent residence (e.g. Colonel Gadaffi of Libya resides in a tent on a regular basis).

The relative definition is certainly not flawless either. As Barrett points out, a person living in Switzerland, with an income less than 60% of the average would (by the C.P.A.'s criterion) be considered poor, while a subsistance farmer in an egalitarian tribal community in Upper Volta would not, even though the standard of living of the former is immeasurably higher.

These issues have been addressed by A.K. Sen. While acknowledging the advances made by Townsend et al, Sen is concerned that by adopting a relative definition of poverty we risk confusing poverty with inequality. Inequality is an important issue and, without doubt, inequality causes poverty, but poverty and inequality are not the same concept. Moreover, Sen is convinced that there is "an irreducible absolutist core in the idea of poverty".

Sen's argument is as follows. He takes the example of a bicycle. The commodity that is a bicycle has the characteristic of transportation which gives the capability to move about, hence yeilding utility. Of these concepts; commodity, characteristic, capability and utility, it is capability that "comes closest to the notion of standard of living". Using this analysis we can conceptualise poverty in a way which accommodates both absolute and relative definitions.

Think for a moment purely in terms of capabilities, and recall Townsend's definition of poverty as an inability to "participate in the activities of the community.....due to a lack of resources". What are these activities? Eating, drinking and sleeping are among them, but so also are educating one's children, socialising with one's peers, engaging in the discourse of daily life and contributing to the general good of society. There is a set of such activities common to all societies, provided that they are defined in sufficiently broad terms. Not having sufficient resource capability to participate in these activities means being in poverty. This is the "absolutist core in the idea of poverty".

Lack of capabilities is caused by a lack of commodities. As Sen puts it :

"At the risk of over simplification, I would like to say that poverty is an absolute notion in capability space but very often it will take a relative form in the space of commodities."

And again:

"Relative deprivation is nothing other than a relative failure in the commodity space, having the effect of an absolute failure in the capability space".

Let us look at Sen's own example which is taken from Adam Smith's The Wealth of Nations. Smith says:

"By necessaries I understand not only the commodities necessary for the support of life, but whatever the custom of the country has rendered it indecent for creditable people to be without.....custom .....has rendered leather shoes a necessary of life in England. The poorest creditable person of either sex would be ashamed to appear in public without them".

In this case the commodity in question is "leather shoes" and the capability is "avoiding shame". Avoiding shame is, according to Sen, an absolute concept.

Either one avoids shame or one doesn't. Not having a pair of shoes is a relative disadvantage in commodity space.

This reasoning is obviously of considerable use in intersocietal comparisons. If we think in terms of capabilities, rather than commodities, we avoid errors caused by assuming that the commodity requirements for capabilities are the same in all societies. Returning to our tent example, this can be clearly seen.

Sen has undoubtably added greatly to the debate in broadening the focus of the discussion from commodities to capabilities. It helps us place many aspects of poverty in an analytical framework. Take for example the psycological effects of unemployment. If we take structural unemployment, then the commodity in question is a (demanded) skill. A lack of the commodity means a lack of several capablities. These capabilities include finding a job, providing an income, socialising with ones peers, making a contribution to society. Hence, a relative commodity deprivation leads to several absolute deprivations in capability space.

But has Sen really solved the absolute versus relative conundrum? It seems that there are two immediate problems with his analysis.

Firstly, there is the question of measurement. How do we measure capabilities? and moreover, is measuring capabilities really in our brief as economists? It is my view that we can measure commodities as a proxy for capabilities using "style-of-living" indicators. It follows from Sen's argument that we should be able to identify certain commodities which are of primary importance in yielding capabilities to the household. So returning to Smith's example, we could survey households to find out how many people had the capability of "avoiding shame" by possessing the commodity of shoes. Similarly, we could gather evidence on a range of commodities relating them to specific capabilities. In separate studies, Townsend and Mack and Lansey have attempted to produce indices of deprivation based on the presence or non-presence of certain goods in the households they surveyed. There are several difficulties with such a method, but the basic approach is in keeping with our foregoing discussion of Sen's analysis. [Note: The E.S.R.I. /C.P.A. report did include an attempt at measuring poverty using style-of-living indicators. In my view these indicators were extremely limited in their range, in the detail in which they were catagorised and in the format in which they were presented.]

Secondly, we know that income distribution is a continuum from the very rich to the very poor. Why then should capabilities be such that one either pocesses them or one doesn't? Surely there are degrees of capability. Reverting to Smith's example of shoes, having a pair of shoes with holes in them is better than having no shoes at all, but not as good as having a new pair in perfect repair. In the case of the shoes with the holes , one is partially "avoiding shame" and so better off than a person with no shoes, but yet still more "more ashamed" than someone with a new pair of shoes. Are there not greater and lesser degrees of capability?

CONCLUSION

The above dicussion has been very general and space has not permitted a detailed discussion of methods of measuring poverty. I feel, however, that a clear conception of what poverty is, is a prerequisite for an informed discussion both of measurement of poverty and of policies to eliminate it.

Colm O'Riordan

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Equality as a Policy Objective

This essay is divided into two sections. The first is concerned with the definition of equality and the limitations involved. We shall see that there are, in fact, two ways of looking at equality and each have their own specific problems both as measures of equality and in their implementation. The second section is concerned with the desirability of equality. Three arguments for equality are presented and then the arguments against which are mainly concerned with the conflict between equality and liberty. I have selected two of the most persuasive advocates of liberty to illustrate this argument - Robert Nozick and Milton Friedman. The conclusion, however, is in favour of equality as a primary policy objective.

There are two ways of seeing equality - equality of outcome and equality of opportunity. We shall look separately at each of these and how they are measured.

DEFINITION AND MEASUREMENT

Equality of Outcome

This is equality in the sense that society's output is distributed equally after all economic transactions have taken place. Since output is valued in monetary terms it follows that equality of income or wealth would be suitable measures of this equality. The tax systems's attempts to redistribute income recognise this.

There are problems with income as a measurement, however. In the first place there is the practical problem that our income statistics are for households rather than individuals. This means that we cannot tell how income is distributed within the household and so cannot ensure equality of outcome for individuals. Indeed, if we increase transfers to the household where one person keeps all of the income we actually decrease equality (the wife and children usually being oppressed). Equality of income between households does not take account of differing numbers of dependents (although this can be adjusted for) and differing needs (not so easily adjusted for).

Secondly there is the theoretical question of whether income is a good measure of overall well-being. Different people get varying levels of utility from different goods. Their work to gain this income may require different work efforts although hours may be equal. How much a person enjoys his work also affects welfare.

Despite these problems with income, it is the best measure of welfare we have. As Beckerman says, the income statistician is not the philosopher-king and cannot be expected to be. The implementation of income equality is even more problematic however. Excessive marginal rates of tax cause disincentives to work and thus impede growth. Indirect taxes, by their nature, are regressive. Even government cannot rely on equality of outcome (measured by income) alone to promote equality. This leads us on to the second way of defining equality.

Equality of opportunity.

As opposed to equality of outcome where equality is defined in terms of the post-transactions period, equality of opportunity is an attempt to equalise people's positions before economic transactions take place. This involves redistribution of endowments. This is the basis of market socialism. If endowments are equal then final outcomes should equalise well-being (disregarding chance or "bad luck" factors) because the extent to which the endowments are used to produce material or non-material pleasures will be directly related to the utility of these pleasures to the individual. This seems ideal but its measurement and implementation are probably even more problematic than those of equality of outcome.

First of all - measurement. There is not much difficulty in measuring inherited wealth in monetary form. If the wealth is in the form of real goods,

however, we have the same problem as above, that due to individual's varying tastes and preferences, different goods yield different utilities and so the utility of the endowments themselves are subjectively determined. Human capital is as important, if not more so than inherited physical or financial wealth. But how can individual talents be measured? And again, different talent would yield different utilities to different individuals.

Secondly - how do we implement this equality? Is wealth redistributed with every new generation? But why should parents be prevented from leaving wealth to their children? This implies that investment in unnecessary luxuries is more important than investment in people, which is contradictory to the purpose of equality of opportunity. And how can human wealth be distributed? - at the extreme this would necessitate slavery - clearly not acceptable.

Since both equalities are attainable only to a certain level government in the welfare state makes use of their two types of redistribution in weak forms to promote equality. Tax revenues are used to redistribute income and to provide free (relatively) education and health facilities to the less well-off in an attempt to increase equality of opportunity. It has been said that the influence of equality on the welfare state has been as an ideal rather than as a numerically achievable objective.

DESIRABILITY

As mentioned above, equality is an ideal of our society, but why so? Why is it desirable?

Arguments for equality.

1. Probably the most compelling argument for equality related to the concept of justice. This is Rawl's "original positions" argument and it states that if everyone was to be reincarnated as a person whose income they could not foretell before the reincarnation, and if each person could decide on the income distribution they would wish for this new society, everybody would choose an equal income distribution. The analogy of the reincarnation allows decision to be based on an original position rather than on people's real relative positions which would influence the decision. The original position argument thus shows equality to be the fairest distribution. To justify this argument completely, one would have to prove that justice is desirable which would also necessarily involve the definition of justice, a problem which has bewildered the greatest philosophers of the last three milleniums. If justice is accepted as desirable, however, then equality of income distibution is the fairest distribution.

2. The "compassion argument" claims that poverty decreases everybody's well-being - the poor because they are poor, the well-off because they feel guilty. Equality would, therefore, increase welfare by decreasing relative poverty.

3. The third argument is that money has a decreasing marginal utility (this need not be inconsistent with the idea of insatiability of human desires - marginal utility may never become negative, but it may decrease to a point where it becomes constant and it is along htis constant marginal utility that desires are insatiable - £10 to someone like a poor student brings more utility than to a millionaire). If the marginal utility of money is decreasing then social welfare would be maximised where marginal utilities are equal i.e. where income distribution is equal.

Arguments against: Nozick and Friedman.

These two writers are both extreme liberals and their objection is not to equality itself, but to the redistribution of resources this involves. Nozick presents philosophical arguments while Friedman gives more practical points.

The voluntary exchange market allows an individual to decide who to trade with, how much to trade, when to trade and what to trade. Intervention in this system amounts to a denial of the individual's liberty, claims Nozick. Friedman adds the practical caution that intervention will likely cause inefficiency. Nozick claims that "taxes are on a par with forced labour". Friedman says that post-tax

distribution may be more unequal than pre-tax distribution because the limitation of supply will increase prices. Nozick claims that no-one has rights to something which involves denial of his rights over something else. He admits that if rights in holdings have been illegitimately acquired, they should be returned to the rightful owner, but if they were legitimately acquired then taxation of them is wrong.

Nozick, however does not define what he means by "legitimately acquired" and herein lies the major flaw in his argument. We assume he means "according to the laws of the state". But many old laws would not be considered legitimate themselves today e.g. black slavery in America. When he says that justice in holdings is historical, he gives no indication of how far back in history the acquiring of holdings should be traced. If we go back far enough, most property is "illegitimately" (by today's laws) acquired. I don't think Nozick would agree, although his argument implies it, that America should be given back to the Red Indians.

Friedman's rejection of any intervention exaggerates the inefficiency involved in intervention. This inefficiency can be minimised by ensuring the proper level of intervention and then making transfers in the most efficient manner possible. Thus intervention should not be rejected simply by an inefficiency argument.

In any case, the liberty which both these thinkers exonerate is a self-contradictory concept itself - never can everybody be entirely free at the same time because if they were each individual's freedom would be impinged upon by the "free" actions of other individuals - life would be "poor, nasty, brutish and short" (Hobbes).

CONCLUSION

It would seem, therefore, that the arguments in favour of equality outweigh those of "liberty" and although there are problems involved in its measurement and implementation, there exist a priori reasons for the government to promote equality, recognising it as an ideal rather than as a numerically achievable objective.

Lisa Finneran

Science: A Modest Proposal

INTRODUCTION;

In this essay I shall argue, in redefining the qualitative restrictions on the term "scientific", that economics is a science, whose status as such depends crucially on the systematic evaluative mechanism provided by econometrics.

ECONOMICS: A MORAL SCIENCE:

Economics is a system of logic developed to study the interactions of human relationships and the institutions which arise from them. The economist generalises from the individual choices of the representative agent into an approximating behavioural theory.

Economics, as a discipline, developed over 100 years ago as the offspring of Political economy. the latter itself inherited its basic doctrines from Moral Philosophy. Because of the "practical relevance" constraint,reproduced from theories of Political Economy, economic theorising has tended to lose much of the scientific status usually associated with the more abstract, natural sciences.(1) It is felt that social inclination towards social involvement is too strong and so, much of the objectivity of the discipline is lost. However, from the Moral Philosophers, economists learned of man's inherent instinct to survive and excel. This notion is incorporated into the central proposition about economic behaviour; the consumer always wants more.It is precisely because economics purports to derive theories of human behaviour from this proposition about human behavior, that it becomes a science.

Keynes' own interpretation was that "economics is a (moral) science of thinking in terms of models combined with the art of choosing the models most relevant to the contemporary world."(2) On this account, econometrics, performing the latter function in this definition, is inseparable from economic theorising within the confines of economic science.The notion of choice, however, explictly mentioned in this definition,implies that economics, as a branch of logic, is a subjective moral science as it concerns itself with "introspections and judgements of value.

The introduction of choice arises from the fact that, unlike other sciences, the base from which economic data are generated is changing through time. As a result, all economic decisions are characterised by uncertainty.Sims has argued that, although meteorology comes close, no other science has the explicit need to confront uncertainty in the models it develops.(4) "Economic models are finite dimensional approximations to infinite dimensional Data Generating Processes(D.G.P)".(5) Itis for this rearon that comparison of economics with the natural sciences is a meaningless excercise. Although both disciplines are characterised by Frisch's "lure of unsolvable problems",and the search for an algorithm of regularities, by their nature and objectives, they are independent intellectual pursuits.

Accepting Mills' wider definition, we see that "science is the accumulation of new knowledge about the world"(6). In the natural sciences, the base from which this information is extracted,characterised by structurally immortal formulae and equations, is constant.

By Duhem's thesis, there is no such thing as a crucial experiment in the natural sciences i.e. one that necessarily changes the outcome of all other experiments by changing the nature of the subject. In economics however, the base is continually shifting . It is meaningless to view an economy as an engineer views a system because in economics, even the basic form and parameters of the characteristic equations of an economy can be regarded as variables through time.Hence the objective in the natural sciences of filling in the values for structurally constant equations would be nonsense in economics and would

destroy the usefulness of economic models as "instruments of thought".

Our natural inclination,then, to deem unscientific any discipline which does not compare well with the natural sciences, is a habit of mind that has arisen from the trust we have learned to place in the latter and the reliability of its prediction. This is destructive of scientific progress. In particular, economics becomes a non-science. The correct interpretation to take is a broader normalist perspective. Much less time should be spent on the essentialists' demand for scientific definitions and classifications. Economics is a dynamic science concerned with analysing real world situations. Indeed Kournai explictly rejects any discipline that does not confront problems of uncertainty and expectation.

This dynamic approach to science, implies that, at least in economics, prediction should be secondary to understanding. Blaug has shown how, in physics, understanding is not a necessary (or sufficient) condition for prediction. (e.g. Newtonian physics has great predictive ability, but little explanatory power). The changing nature of structural parameters implies that attempts to understand the underlying black box D.G.P are more important than forecasting. This is exacerbated by the "practical relevance constraint"; what you don't know can hurt you. On this account, short run disequilibrium economics will be far more scientific than long run equilibrium theories. Practical relevance dictates that reaction and repair are far more important than improvement.

How, then, is econometrics useful in all of this? We have already demonstrated that econometrics is, broadly, the process by which we choose the model most relevant to the real world. Progress in economics, as a science, will depend in part, on the improvement in the choice of models.(7) This unification of economics and econometrics is the potential of economic science. Emmer has pointed out however, that the discipline itself is not unified. We cannot move smoothly from one area of discipline to another.(8) In contrast, the observations about which economists make statements are unified. An explicit role therefore is outlined for econometrics: to aid in the unification of the subdiscipline of economic science in terms of the methodological approach taken to the acceptance/rejection criteria for economic theorizing.

ECONOMETRICS: A PATH TO UNITY

Consistent with this notion of unification is Frisch's 1933 address to the Econometric Society: econometrics is " the unification of the theoretical qualitative to the empirical quantitative ".(9) In fact, without some evaluative process, then almost any relationship thrown out by economic theory could be defended. The overconcentration on theoretical issues in economics (evidenced by the increasing use of mathematics in the academic journals, a development which, as Leontief put it, "serves to make economics barely distinguishable from any branch of pure maths") has led to a loss of focus on the central constraint in economics: practical relevance.

The purpose of any econometric analysis, and the resulting predictions, is to aid policy-making. As a result theoretical and empirical studies have tended to be "macro" in nature. However, Buchanen has argued that, because macroeconomics moves away from the central theory of human behaviour, it becomes unscientific. The use of aggregation (applying aggregate data to hypothesized relationships which are assumed to be generated from the behaviour of the representative agent) is particularly questioned.

Granger, on the other hand, provides the saving grace to macroeconomics the claims that economic theory is highly compatible with aggregation since theoretical relationships can be drowned out at the micro-level, by individual specific factors which average to zero over the range of the population. In any case, the temptation with microeconomics is to assume structural constancy of the relationships of the "representative agent" through time. We have shown that economic parameters are not constant through time, so that by adapting econometrics to be systematically progressive through time, we maintain the

scientific status of economics, while also maintaining practical relevance and real world applicability.

That is economics, being an observational rather than an experimental science, is evidenced by Leamer's claim that economic processes leading to observation are uncontrolled. It is more constructive, however to regard them as controlled by nature. The focus of econometrics,then, correctly falls onto the approximation of "black box" relationships with a view to understanding the nature of that control.

This is the potential of econometrics. In reality there has been no "unification". Indeed the econometric practices of the 1970s, in response to the breakdown of many established macroeconomic relationships led Leontief to conclude that "economics is an unsatisfactory and slightly dishonest state of affairs".(10) The illegitimate use of data-mining and the ad hoc specification to find the "line of best fit" have led to skepticism about economic discipline and it's findings.

In general, two wide-ranging methods have been used to accumulate knowledge in economics; (a) induction (or generalising from the specific) and (b) deduction (moving from the general to the specific). Both of these procedures are subject to limiting problems.

Since all knowledge is taken to be empirical, the latter, which is by definition the combination of two or more inductive inferences to make a new statement, cannot create new knowledge. Induction, however, is equally constrained in terms of prediction. If an event occurs 100 times per day for X-years and no perceivable change has occured to alter this, can we logically say that inductive inference extends to the future? We cannot because to do so would be to make an inductive inference based on our 100X observations thus begging the question.(11) These problems serve to set limiting bounds on the degree of confidence we can have in a predictive statement.

Specifically, we can outline three problems with current methodology, each of which has been tackled in the debate between the American and British schools; (a) the overuse of a priori assumptions,

(b) predictive failure of the models and (c) dynamic misspecifation.

Quine has shown how theoritical restrictions placed on models in the form of maintained hypotheses effectively means that we face the world with the whole of scientific knowledge.This makes it difficult to confront the model with the data(12). Although some restrictions must be placed on models, "cook-book" econometricians have tended to abuse this justification.

Predictive failure is evidenced by the macroeconomic void created by the stagflation of the 1970's. If econometrics is to be useful to policymakers, it must be able to forecast disturbances to maximise the speed of recognition and repair.

Finally ad-hoc specification, particularly in terms of assumed lags, is arbitrary and unjustifiable. Econometric specifications have tended to ignore the role of self-fulfilling prophesies and the ubiquitous impact of the observer on the nature of the environment itself. This reverse causality constrains the usefulness of th econometric model.

Fortunately the saving graces for econometrics have arisen from the Sims-Hendry-Leamer debate.They each purport to inject solid evaluative acceptance/rejection criteria into the discipline.

Sims' starting point, consistent with his distaste for the use of priors, is explicitly atheoretical(13). Rather than allowing assumed marginalisation and conditioning procedures, his VAR approach assumes, as in the DGP, that all variables are endogenous. In any regression equation, variables are ordered according to relative importance, pending the outcome of causality tests. It is unclear whether predictive ability will be enhanced but certainly, econometrics becomes more objective.

Leamer's EBA confronts the problem of "priors" in a framework of uncertainty. All priors must be stated and tested with regard to the data. In

particular fragility tests and sensitivity tests are carried out to measure inferential changes from model specification changes. With all priors stated and tested, and alternative specifications evaluated, it is left to the user to determine the degree of belief he wishes to place in the model's predictions.

In terms of confronting the dynamic nature of the real world, the Hendry approach comes closest to injecting hard Popperian evaluative standards into econometrics. He claims that the stationary stochastic assumptions of the VAR and EBA approaches, assume constancy of some underlying model. This contradicts economic nature. His starting point is that useful econometric models must adequately describe the data to which they relate. Such models are only approximations. "Economics should be regarded as a destructive process with constructive intent".Models, then are purely matters of design and not of absolute truth. Testing of marginalisation and conditioning then, maximises the practical relevance constraint by applying real world changeability.

CONCLUSION:

Economics is a dynamic science involving unavoidable degrees of subjectivity and introspection. Econometrics, as an integral part of economic science, must be equally dynamic to allow progress in that science in terms of the systematic accumulation of knowledge about the real world. Recent attempts to incorporate uncertainty into econometric model design then, can only be seen as an extension of the scientific status of economics.

Ciarán John O'Neill

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The Development of Econometrics

A recent survey of American graduate students asked what mattered most for success in economics: 57% said that "excellence in mathematics" was "very important"; only 3% said the same of "having a thorough knowledge of the economy", while no less than 68% thought that was "unimportant" (1). The present emphasis on mathematical formalism and the consequent evaluation of economic models in terms of logical validity and internal consistency makes the role of econometrics rather ambiguous. On the one hand, this self-referential evaluation of economic theories denies the importance of empirical testing. On the other, economics aspires to be a policy science, to be taken seriously by decisionmakers. Sargent refers to the strategy of current research as such: "These little models are abstractions. The test for whether they are realistic or not is in the econometrics" (2). The function of econometrics, then, in the current understanding of what is meant by economics as a science is to be an indirect corroborator of theory. Empirical models exist at several removes from the underlying theoretical models and hence econometric results are treated with due caution and scepticism. This essay seeks to explore how the role of econometrics as a validator of economics as a science has developed through time, in line with the evolution of the definition of economic science and with changes in our appreciation of the capabilities of econometrics.

Prior to the 1930s economists saw their subject as the parallel of Hamiltonian mechanics in physics(3). This entailed the development of marginal analysis, "a calculus of pleasure and pain". Economic theory was believed to be exact and true, but incomplete. The quantum revolution in physics, it is argued, forced economists to revise this picture and to actively incorporate random factors in their economic models. To this end, the use of statistical techniques (especially probability theory) seemed appropiate. The Econometrics Society had been founded in 1930 to further "the unification of theoretical- qualitative and the empirical- quantitative approach to economic problems". Prior to this, the two strands were largely divergent. Empirical economists specialised in seeking new relationships by exhaustive data analysis projects. A good example was the agricultural economist von Thunen who based his farm specialisation theories on his interpretation of farm records collected over many years. Empiricism, then, was intent on developing its own results rather than testing the prescriptions of theoretical economists.

The introduction of statistical techniques into economic models in the 1930s instilled optimism that a reconciliation could be achieved. The application of classical probability theory to economic problems also made viable the testing of theoretical results, it was believed. Early work, such as Tinbergen's report for the League of Nations, engendered a debate about the proper methodology in economics. Keynes led the counterattack (4). He argued that making classical probability assumptions was inappropiate except when economic situations resembled games of chance. Moreover, multiple regression analysis as employed by econometricians merely established correlation and not causation and was invalid anyway if the empirical model was misspecified. A second round in the debate was the controversy between Koopmans and Vining in the late 1940s (5). The function of empirical research, Koopmans argued, was to investigate the validity of theoretical statements, measurement without theory being a wasteful exercise. The use of aggregated data to test hypotheses concerning individual agents was justified on standard stochastic principles, the influence of idiosyncratic factors cancelling out. Vining's retort was that realism should not be sacrificed for the sake of the researcher's convenience (6).

This debate essentially concerned conflicting opinions as to what constitutes a science and the validity of regression econometric methods. Haavelmo's

manifesto for econometrics took a pragmatic line: "the question is not whether probabilities exist or not, but whether- if we proceed as if they existed- we are able to make statements about real phenonema that are 'correct for practical purposes' " (7). This instrumentalist position, placing emphasis on predictive ability rather than description, is consistent with later developments in economic methodology such as the work of Friedman. However it was antithetical to the realist requirements of Keynes and Vining.

The second set of objections could not be so easily evaded. The AER style of econometrics which developed was rather too confident in the ability of classical probability to deal with the non- experimental nature of economic data. At the extreme, the assumption of correct model specification implied that the econometrician was doing no more than corroborating a theoretical model that was axiomatically correct. Most seriously, the assumption of a well- behaved error term could not be maintained. The neat division between deterministic and random components was believed to be important if the contemporaneously popular positivist vision of science was to be upheld. Positivism required the direct confrontation of theory by the factual evidence and the AER method attempted to do this.

The perverse behaviour of the error term was forcing applied econometricians to engage in various illegitimate procedures (collectively known as data- mining) to achieve workable model specifications. Inevitably, this had consequences for econometrics' role as a validator of economics as a science. But movements in the philosophy of science were also occuring. The impossibility of objectivity in the observation of data was acknowledged and it was recognised that scientific progress was due more to individual innovation and paradigmatic shifts than to 'normal' research. Feyeraband parodied the situation by espousing methodological anarchy.

The consequence for economics as a science was that methodological pluralism is possible. For the majority, as outlined in my opening paragraph, the most fruitful strategy is taken to be greater mathematical formalism. Pluralism does also open the door to a resurrection of the old empiricist tradition, it should be noted. The new philosophy of science was also of comfort to econometricians. Given that science was limited in its capabilities and that its results were highly uncertain, it followed that a more modest role was suitable for econometrics. Moreover, the theory- laden nature of data observation conferred legitimacy on data- mining practices.

These arguments are incorporated in the new econometric methodologies of Leamer and Sims (the US school) and Hendry (the LSE school). Key words are fragility, sensitivity, tentative, conditional, whimsy. The US school even treats the concept of probability as tentative, taking a Bayesian approach. It is argued that econometric results are only useful if they are robust to changes in the modelling assumptions, making sensitivity testing essential (8). Hendry emphasises the very approximate relationship between the empirical model and the underlying data- generating process (9). It is interesting to make the connection between the atheoretical ethos of Sim's VAR approach and the older empiricist tradition, also. The tendency in these new methodologies, it might be argued, is to maximise the credibility of economic science by making as few claims as possible for the econometrics (10).

This leaves affairs as stated in the opening paragraph of this essay. Spanos argues (11) that the desired convergence between the theoretical and empirical approaches is now more possible. The complex relationships between the DGP, theoretical models and empirical models are better appreciated today and the new cointegration models recognise that economic theory has to be considerably 'boosted' in terms of dynamic specifiation in order to be statistically significant. This more sophisticated role for econometrics, Spanos argues, requires a more general definition. I shall conclude with his holistic interpretation of what econometrics is and this definition is illustrative of the new scepticism

concerning the proper bounds of economics as a science, which is required if economics is to restore its relevancy to real- world problems. Thus - "econometrics is concerned with the systematic study of economic phenomena using observed data" (12). Not an overly arrogant statement, by any means!

Philip Lane

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The Status of Economics

The question that needs to be addressed at the beginning of this paper is one of the whole polemical issue of economics and the social sciences. How can we possibly attempt to discuss the influence of econometrics on the scientific status of economics, if we have not already decided our stance on the much debated and hackneyed issue.

Economics is fundamently a discipline that deals with man as he is[1]. At its best, economics seeks to harness man's very human motivations to the public interest. Gnawing questions persist among economists and social thinkers generally concerning the nature and scope of economics as well as its value and place in the constellation of scientific disciplines. Not all economists have approached the subject in the same way, nor do all agree on the boundaries of the subject, the role of the individual versus the group, the method of analysis to be employed, or the object of economic investigations.

It is often said that we live in a scientific age. Over the last several hundred years the citizens of most western countries have enjoyed the fruits of innumerable scientific discoveries . But the scientific advances that so profoundly affected the average citizen have been made by an extremely small minority of the population. These advances have generally been accepted without even the slightest idea of either the technical nature of the discoveries involved, or the attitude of mind that made them possible. If we take as a measure of the influence of science, the degree of dissemination of the fruits of science, then we live in a profoundly scientific age, but if we take as our measure the degree to which the general public understands and practices the scientific approach, then we are definitely in a pre-scientific era. Indeed, the scientific method of answering questions by appealing to a carefully collected and coordinated body of facts is a method that is seldom adopted by the public. *"Economics"*, said the American economist Jacob Viner, *"is what economists do"*. This unusually vague definition is somewhat supported by the fact the 'doings' of the economist may not be easily identifiable by the public but may have enormous effect. This interpretation would enhance the whole idea of economics as a science.

However, in assessing the whole question of defining economics as a social science, the most frequent question raised is whether or not it is possible to have a scientific study in the field of human behaviour. It is often argued that natural sciences deal with inanimate matter that is subject to natural 'laws', while the social sciences deal with man who has free will and cannot, therefore, be made the subject of inexorable laws. In this century alone, the physical sciences have been offering vivid proofs of their success of a kind calculated to appeal to the twentieth century mind, as Camap[2] explains *"Thus with the aid of the new logic, logical analysis leads to a unified science"*. Meanwhile the moral sciences have undergone a crisis of confidence. From Copernicus to Newton is one hundred and fifty years. Today, over one hundred and fifty years from the "Wealth of Nations"[3], we have not found, nor should we expect to find, the Newton of economics[4].

Very roughly speaking, the scientific approach consists in relating questions to evidence. The ease or difficulty with which one can collect or even manufacture evidence does not determine whether or not a subject is scientific or nonscientific, although many people believe that it does; it is merely one of the factors determining the degree of ease with which the scientific inquiries of various fields can be pursued. It is often thought that scientific procedure consists of grinding out answers with reference to blind rules of calculation and that it is only in the arts that the exercise of real imagination is required. This view is misguided for there are no set rules for the framing of questions. It is a step that often requires great imagination. Also, the collection of relevant

evidence often requires ingenuity. What the scientific method gives, is an impersonal set of criteria for answering some questions; but what questions to ask and exactly how to ask them and exactly how to obtain the evidence, are different problems, requiring upon occasion great feats of imagination[5]. The way in which scientific inquiry proceeds does, however, differ radically between fields in which laboratory experiment is possible and those in which it is not.

The 'behaviorist' claim that science should only deal with phenomena that are directly observable must be rejected with respect to economics because the explanations which economists offer ultimately must refer to an individual's subjective valuation process which is 'understandable' but not 'observable'. Because of this, the procedure of a social science like economics *"can never be completely assimilated to the procedure of the physical sciences"*[6]. One has unfortunately to admit that neither the simpler type of economic theory nor its most modern dynamic versions have brought us very far along the road toward detailed explanation, not to say prediction, of the scientific states of the actually observed economic system[7]. This is of course not to denigrate the importance of methods and techniques of investigation. In the development of science they have probably played as important a role as basic theory. The two are in fact intimately inter-related : theory poses questions, methods are devised to answer them, the answers or lack of answers make more theory necessary, and so on ad infinitum. It is at this stage of the argument that the whole question of the role of econometrics comes to the fore.

Econometrics is a rapidly developing branch of economics, which, broadly speaking aims to give empirical content to economic relations. It can be defined more accurately in the words of Samuelson, Koopmans and Stone[8] *"as the quantitative analysis of actual economic phenomena based on the concurrent development of theory and observation related by appropriate methods of inference"*. By emphasizing the quantitative aspects of economic problems, econometrics calls for a 'unification' of measurement and theory in economics. Theory, without measurement, being primarily a branch of logic, can only have limited relevance for the analysis of actual economic problems. While measurement, without theory, being devoid of a framework necessary for the interpretation of the statistical observations, is unlikely to result in a satisfactory explanation of the way economic forces interact with each other. Frisch[9] was aware of this need for unification : *"Statistical information is currently accumulating at an unprecedented rate. But no amount of statistical information, however complete and exact, can by itself explain economic phenomena"*.

On the relation of science and econometrics, Karl Pearson[10] put forward a 'unity of science principle' which is as follows : the unity of science is a unity of methods employed in analysing and learning from experience and data. The subject matter may be economics, history, physics or the like, but the methods employed in analysing and learning from data are basically the same. As Jeffreys[11] expresses the idea : *"There must be a uniform standard of validity for all hypothesis irrespective of the subject. Different laws may hold in different studies, but they must be tested by the same criteria; otherwise we have no guarantee that our decisions will be those warranted by the data and not merely the result of inadequate analysis or of believing what we want to believe"*. Thus the unity of science principle sets the same standards for work in the natural and social sciences. As Karl Pearson, Harold Jeffreys and others state, one of the main objectives of science, and I add of econometrics, is that of learning from our experience and data. The field of science is unlimited : its material is endless, every group of natural phenomena, every phase of social life, every stage of past or present development is material for science. The unity of all sciences consists alone in its method, not in its material. The man who classifies facts of any kind whatever, who sees their mutual relation, and describes their sequences, is applying the scientific method and is a man of science[12].

Thus for Pearson, the simple fact that social and economic phenomena

constitute an investigator's subject matter does not preclude his being scientific if this term is understood as meaning using scientific methods in dealing with the analysis of observational data. The position taken here, is that econometric model use is a key element in the scientific method and thus the use of econometric models is a key element in scientific method analysis of social phenomena is part and parcel of scientific approach to the analysis of social phenomena.

Economics has come a long way over a relatively short period of time. Important advances have been made in the compilation of economic data and in the development of concepts, theories and tools for the construction and evaluation of a wide variety of econometric models. Applications of econometric models and methods can be found in almost every field of economics. However if we were to rely on Lord Keynes evaluation of mathematical economic models as *"mere concoctions"* we would perhaps miss the point. Although there are limitations with econometrics which stem largely from the incompleteness of the economic theory and the non-experimental nature of economic data so that the specification of econometric models inevitably involve important auxiliary assumptions about functional forms, dynamic specifications, latent variables, with respect to which economic theory is silent or gives only an incomplete guide.

But the limitations should not distract us from recognising the fundamental role that econometrics has come to play in the development of economics as a scientific discipline. The standard rule for scientific inquiry states that firstly theory has to be formulated, and secondly the theory has to be tested against the empirical facts so that it can be either verified or falsified[13]. This is the influence of econometrics, so much so that it has earned the status of being recently defined by Chow[14] as *"the art and science of using statistical methods for measuring economic relations"*.

Niamh Clarke

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The Market System, Freedom and Efficiency

EFFICIENCY, FREEDOM, THE MARKET AND GOVERNMENT INTERVENTION.

This essay intends to argue that, theoretically, the market system is conducive to efficiency and economic freedom, but, in practice, Government intervention is often required. I have thus divided the essay into two main sections: the first is a justification of the market system by showing that efficiency and freedom are better achieved through the free market than through its antithesis, government control (efficiency and freedom must first, of course, be shown to be desirable objectives themselves); the second is a justification of government control due to market failures and deficiencies. This section includes a provisory note on how intervention itself may not be carried out adequately. My conclusion draws the thesis and antithesis together and a synthesis is proposed.

SECTION 1: THE MARKET JUSTIFIED.

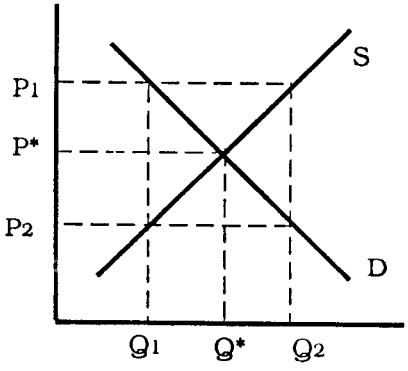
Pareto efficiency says that a situation is efficient if nobody in it can be made better off without reducing somebody else's welfare. If we make the following three (quite plausible) assumptions, we can see economic efficiency is desirable.

(i) the aim of policy makers is to maximise social welfare.

(ii) the social welfare depends positively on the welfare of the individuals in the society.

(iii) individuals' welfare depends on the goods and services they consume.

There are two categories of efficiency - efficiency in exchange and efficiency in production. If we make the fourth assumption that (iv) individuals are the best judges of their own welfare and act in their own self interest, we can show that a pareto efficient situation is achieved by the free market system.



It is through the price mechanism that the market achieves efficiency in output and exchange. If output Q1 is produced, consumers will be willing to pay more than the suppliers must be paid to produce Q1. From assumption (iv) it follows that (as profit maximisers) suppliers will increase production until the point where consumers are not willing to pay any more than that which is required for the producer to supply. At this Q* prices are equal to P* and none can be made better off without making someone else worse off by a change in output. Thus efficiency is achieved in production.

In the free market marginal rates of substitution are equal. If they were not, goods would be valued differently and so further trading would take place. We assume all goods in the competitive market are valued in monetary terms only. Thus if one person values a good at £4 and another at £5 trading will take place. Trading will stop when the marginal rates of substitution between all goods is equal to the ratio of their prices. But consumer theory tells us this is the optimal point for the consumer since it is the point where his budget line is tangential to his highest attainable indifference curve. Thus when MRS = ratio of prices each consumer is at his optimal point and nobody can be made better off by further trading without making someone else worse off.

Heald shows how production by the public sector is X-inefficient i.e. too many inputs are used because profit maximisation is not the primary concern of the individuals involved as employees. He also shows how free provision of

services is inefficient as the quantity demanded at this point exceeds the quantity at which MR = MC (profit maximising point). Thus the efficiency achieved through the free market system is not emulated by the public sector.

I shall now turn to issues of economic freedom, which, by definition implies individual choice. It is desirable because

(i) it allows for consumer sovereignty - in buying what he wishes at a certain price and leaving other products behind the consumer effectively controls what quantity of what good is produced(Galbraith, though denies this).

(ii) choice itself is a psychological benefit (challenged effectively by Mishan)

(iii) Economic freedom is a prerequisite for political freedom. This point is probably more topical now than ever. All over Eastern Europe, popular revolutions have occurred. A priority of the new leaders is to develop a free market system. Hayek has consistently argued that control of economic transactions is "the Road to Serfdom". He says that whoever controls the means also controls the ends and thus controls man's goals and thought and purpose in life. Any freedom requires economic freedom.

How does the market allow freedom? Economic freedom and the market are so closely linked that they are practically the same thing. Both of them mean that people can choose who to trade with, when to trade and how much to trade. The market is simply the title for the systematic working of economic freedom. However the market does have its imperfections and deficiencies. This leads us onto the second section.

SECTION 2: JUSTIFICATION OF GOVERNMENT INTERVENTION.

Government intervention is justified where there are market imperfections. There are four main imperfections.

(i) When externalities exist the social cost or benefit is not completely captured in the price of a good i.e. the cost or benefit is not measured in monetary terms. Externalities usually tend to be costs because the opportunities for increased profits due to benefits means that there is an incentive to internalise these. In ignoring social cost the market prices the goods involved at a lower price than that where real MC = MR. It does not produce at the optimal quantity and inefficiency results. It has long been recommended that government should impose a tax on such goods so that the extra cost will be reflected in monetary terms.

(ii) Public goods are goods which due to the jointness of their consumption are not provided for by the market. Public facilities such as parks or playgrounds are examples. If everyone had to pay for these in relation to the benefits each received from the facilities individuals would understate their benefits and so total welfare from the facilities would be underestimated. This would lead to decreased provision or perhaps non-provision of the good. Depuit's argument against toll bridges (an argument which applies to all goods which show a very small operating cost once they have been provided) shows how allocative efficiency can be improved by suppression of prices. Some industries, such as those supplying electricity or telephone communications networks, have such large capital requirements that only government could provide them. The private sector would be incapable of dealing with the rail-link between London and the Channel Tunnel and government has had to take over.

(iii) The market's assumption of perfect information is clearly unrealistic. Scitovsky compares the economy to a Chinese Menu - due to lack of expert knowledge or information we either choose the wrong dishes or the same old boring ones - this causes inefficiency.

(iv) Finally, perfect competition exist in reality and governments must intervene to reduce inefficiencies caused by monopoly power.

There are other faults of the market due to its deficiency in aiding primary policy objectives - which include instability in output and employment, the fact that the market is geared towards present allocation rather than future growth

and its tendency to intensify income inequality. There exists, therefore, a priori reasons for government intervention.

This must be qualified-intervention itself has its weaknesses. One of these lies in the difficulties involved in reflecting individual preferences in public decisions. Economic reasoning sees maximum social welfare as the independent addition of maximum individual welfares. It does not recognise that an individual's consumption is affected by the consumption of others. For example, my utility from driving to work is affected when everybody else decides to drive to work and I get caught in a traffic jam. The lack of collective choice mechanisms causes problems in public policy making.

There is also the problem of the "over-expanded" public sector. We cannot assume that politicians and civil servants are the only economic agents who do not try to maximise their utility i.e. votes in the case of the politician and budgets in the case of civil servants. This can lead to decisions being made simply to satisfy the demands of certain interest groups or to increase a department's budget for the sake of influence/prestige, rather than for efficiency reasons.

"Baumol's disease" is another problem with the "over-expanded" public sector. This occurs in sectors where output is qualitatively rather than quantitatively measured e.g. Health and Education. The image of the disease tries to reflect the problems involved when wages of the sector continue to increase (to keep up with the wages of the private sector) while output remains constant. Ireland's public sector has suffered much from this disease in the past twenty years.

CONCLUSION

The market is no doubt an excellent system - efficiency and freedom being two of its most desirable features. However there are cases where it is less than perfect and in these cases government is justified in intervening to increase welfare. But although market failure is a necessary condition for government intervention it is not a sufficient one as the intervention itself may also fail. Thus failures of the market must be balanced against failures of intervention and the right combination of each chosen so as to maximise welfare as constrained by policy objectives. The attempt to unite the advantages of the market system and those of government intervention has resulted in a synthesis of both, today's mixed economy.

Lisa Finneran

The Development of Economic Policy in Nicaragua: 1979 to 1985

The extremely complex dynamics associated with the transformation of a primarily agrarian and feudal society to a modern industrial one without the "necessary preconditions" for revolution left the Sandanista government with many dilemmas and countless problems in formulating economic policy subject to a future based on a mixed economy. However no analysis of Nicaragua can ignore entirely the profound effects that U.S. attempts at destablization of the state had on the near "Wartime economy".

In common with most other underdeveloped countries (LDC's), Nicaraguan "economic development" was based on agro-exports and therefore hampered by its vulnerability to commodity price fluctuations, trade deficits, and consequent balance of payments problems. Industrialisation was not encouraged and where it existed, it supplied mainly the domestic market and used a high import content in its produce. The Somoza dictatorship (which had spanned over 50 years) was corrupt to such an extent that even multi-national corporations (MNC's) were forced to support (initially) the Sandinista revolution, in the hope that the new government might not be so greedy! Prior to the revolution of 1979 Nicaragua was one of the poorest and most unjust societies in Latin America. Its life expectancy rate at 53 yrs was the lowest in Latin America, and 15 yrs lower than its "next door neighbour" Costa Rica! 75% of the population lived in rural areas and an 1973 estimate put at 66% the the level of the people who were under-nourished. Although the Somoza dictatorship borrowed quite heavily (1.3bn) very little of the money was used to improve the lot of the small producer, who dominated as a percentage of the economically active population (EAP). However a World Bank mission in 1952 reported that "The concentration of income in a relatively small part of the population should be a favourable basis for increased industrial production, through private capital formation". Dualism in its extreme perhaps!

However this was not to be and during the 70's worldwide inflationary pressures, fluctuations in agro-export prices and the growing foreign debt brought industrial production to a standstill. In 1979 these pressures amongst others lead to a popular revoloution lead by the Sandinista's (FSLN party), and the overthrow of the Somoza dictatorship, coupled with full confiscation of all their holdings, land, factories and wealth. During this upheaval there was a huge flight of capital , total disruption of trade, food and foreign exchange shortages and the almost total abandonment of the productive facilities in the economy.

Nicaragua's growth pattern fits in very well in the dependency perspective of economic development in LDC's. The direction and composition of its output has been shaped by the needs of the core countries and most of its output is non-processed agro-exports. like many other peripheral LDC's, Nicaragua's dependency was not directly enforced but was internally perpetuated by the extraordinarily rich elite who benefited greatly from the support of the core countries politically, economically and sometimes militarily, when the need arose. Any industrialisation that did occur in Nicaragua was poorly integrated with other indigenous producers and therefore was totally dependant on its raw material or technical imports, from the core country. However the new regime did not try to break the links to the core countries, but it did attempt to sway the balance a little in Nicaraguas favour.

Bearing in mind that the private sector in Nicaragua accounts for over 50% (58% in 1989) of GDP it was accepted that no attempt to socialize the entire means of production would be attempted, and that private investors should be guaranteed that confiscation of their property would not take place. The objectives to be aimed for were all to be a basis for, "initiating the process of transition". More specifically they were

1. To reactivate production/distribution with the aim of satisfying the basic needs of the population.

2. To build and maintain a level of "national unity" amongst workers and small producers, professionals and "patriotic entrepreneurs".

3. To establish and maintain macroeconomic and external sector balances.

Although the government had no direct control over the private sector it did have considerable influence through its 100% ownership of the banking system and its very strict control over currency movements.

The initial economic policy developed in 1979 focused mainly on development through agro-industry. Although the government was aware of the danger of over dependence on agricultural exports, it had to admit that realistically in the medium term it, at least agriculture would provide the basis for industrial development, through increased output and vertical integration. As regards banking the government operated a policy of a fixed exchange rate for the Cordoba, which was intended to help indigenous industry import its necessary inputs, it also had the advantage of keeping the inherited national debt (in dollars) at a realistic if not affordable level.

The nationalised banks also extended a very generous credit policy to small and large producers alike, which in effect were charged "negative interest rates" at the level of inflation prevailing. This credit policy did not discriminate in favour of the public sector , and indeed in the period 1980-82 54% of all credit was made available to private producers, including many huge ranchers and plantationists. However most of this credit was directed to private agricultural interests and not the industrial sector which was still reluctant to invest even at low interest rates.

The government efforts to restrict the consumption of non-essential goods and increase the consumption of basic goods and public services, led to a policy of restriction of imports of luxury goods and widespread subsidisation and rationing of basic-goods. Coupled with this price strategy the government implemented an incomes restraint strategy. The reasoning behind this was the knowledge that increase in nominal wages only served to increase the price level to the disadvantage of the majority and that increasing the supply of "wage goods" was the best way to improve income distribution. Policy for industrial development was more long term in nature and included among its objectives , a strategy of emphasis on production of basic consumer goods, basic inputs for agriculture, construction, national defence and transportation. In short, industry was encouraged to increase its technology and trade linkages with agriculture and other indigenous industries in order to achieve greater integration and more "value added" in the economy, and in doing so lessen its dependence on imports.

During the years after the first Economic plan, many problems developed and many of those that were there already exacerbated. The government's attempt to restrict imports was partially successful with a dramatic fall in consumer good imports, however there was still a huge demand for raw materials and inputs that were vital for most of the priority industries. The government was forced to restrict foreign exchange to only the most pressing of needs. This hit private industry particularly hard as it relied to such an extent on foreign inputs. A related problem was the continued existence of low levels of integration between industries. This has been a major contributor to the persistence of low levels of productivity in the industrial workforce which has been estimated in dollar terms as $10,000 per worker per year in output (max.). Other non-economic factors have contributed to this lack of productivity in industry including the departure from the country of many technically qualified people and the lack of administrative experience and knowledge on the part of managerial and technical staff.

The government policy of wage containment and widespread subsidies of basic goods also had counter productive results. The difficulties encountered by the state in exercising control over the market place allowed speculation and

wide spread arbitrary price increases for manufactured goods which mushroomed into a massive black market. Conversely agro-producers affected by these price increases for manufactured goods sought higher prices for their produce by selling their subsidised (but rationed) produce at much higher prices in the black market.The wage containment policy led to more migration from rural to urban areas, where incomers became involved in diverse informal activities, which were more lucrative than agricultural work. This in turn led to a scarcity of workers for the harvests.

A scarcity of foreign currency began to appear in 1981. The needs to raise foreign exchange through a policy of export encouragement coupled with import restrictions were not met. Instead the maintenance of a deliberately overvalued Cordoba became an insurmountable obstacle to increasing exports, just as it became a permanent stimulus to the demand for imports. This overvaluation was reflected in the huge black market for foreign currency where the exchange rate for the U.S. dollar was more than 50 times the offical rate in 1985. This difference in exchange rates for export revenue and import purchase also resulted in financial losses for the Central bank that were covered by more paper money issues. Also the strong demand for dollars by the private sector for consumption purposes which could not be supplied by the government led to even more contraband imports, smuggling and a more profitable black market. The generous credit policy and the low price of imported supplies (due to the overvalued Cordoba) could not compensate for the decline in profits resulting from the overvalued Cordoba.

The new economic policy announced in 1985 was aimed to overcome the failings of the original one and at the same time reverse the trends in the parasitic economy that were fast gaining ground. In 1982 alone it was estimated that over 30,000 workers went into "self-employment" in the informal sector. This new economic policy included some very unpopular measures, and some were almost monetarist in nature. Huge spending reductions were announced, subsidies were eliminated on many basic food items, a freeze on public employment in administration was announced and government investment in capital projects was sharply cut down. Resources were to be assigned to priority areas of production in most cases and stimulants in the form of changes in prices, wages and exchange rates were all part of the new policy. New producer prices and wage increases were aimed at concentrating capital and labour in the productive sector and resources previously directed towards health, education and housing were to be diverted towards production and also, it must be said, the increased need for more defense against invasion. The new foreign exchange policy involved devaluing the Cordoba to 1/3 of its previous level although this meant little difference in the huge gap between offical and black market exchange rates which still remained. Different rates of exchange were established for different activities. These new rates were not going to improve things in the long run as seen by the bias towards consumption expenditure on imports. However compensatory measures in regard to wage increases (100% for agro-workers) were hoped to keep purchasing power at an equivalent level. These policies aimed at increasing production while allowing for wage/ price increases through direct distribution of goods to workers.

In fact the government policy of gradual reductions in the exchange rate have not prevented this. In 1989 Nicaragua had the world's highest inflation at 30,000%. This has been accompanied by a sharp decrease in the living standards of the people. However, economically, now as in 1984 Nicaraguas main hopes (and a source of most of its problems) rest outside its frontiers.It is a small impoverished country still struggling for survival against exploitation. Peace in the region is a necessary but not sufficent condition for economic growth and stability. Great gains have been made since 1979 which have benefited most Nicaraguans, hopefully these gains will be built upon by the new administration and not destroyed by a return to the old order. **Eoin Lonergan**

The Gang of Four

"The small manufacturing oriented countries resemble other small countries in their high dependence on trade but are closer to the large countries in the overall composition of their exports. In the majority of cases they are also highly dependent on an inflow of external capital in the early stages of transition. The result is a unique development pattern whose properties are less easily predictable from general economic reasoning than are those of the other two patterns (large countries and small primary product oriented countries)."(H. Chenery,1979)

INTRODUCTION.

The increasing difficulties experienced by many under-developed countries in their attempts to pursue a strategy of import-substituting industrialisation (ISI) led to a critical reappraisal of its longer-run viability and encouraged the revival of a more orthodox view of industrialisation based on an outward looking, export-oriented trade strategy. Besides contrasting its virtues to the distortions of the ISI model popular throughout the 1960's, advocates of this model - Export Oriented Industrialisation (EOI) - frequently illustrate its merits by pointing to the remarkable success of its four most prominent practitioners - the East Asian "gang of four": Hong Kong, Singapore, Taiwan and South Korea. However the policies pursued by the newly industrialising countries (NICs) based though they were on export growth as the foundation for sustained industrial development provide unwelcome anomalies to both the dependency and neo-classical paradigms. The model will be examined at length with particular emphasis being placed on the role of the state, the contingency of world prosperity and economic buoyancy and the inapplicability of its generalisation without provoking protectionist measures from the advanced industrial countries and thus ruling out the emulation of the NIC model.

Before discussing ISI and "export promotion" strategies, an important caveat must be stressed. The two "alternative" strategies are not mutually exclusive especially when we consider that they refer to both long-term development strategies and short-term development concerns. When a government is faced with a sudden imbalance between the revenue generated by exports and the cost of imports, it may well limit imports, without this being ISI. In the interests of getting enough foreign exchange, virtually all governments promote exports, without this being a strategy of export promotion.

I have chosen the topic of the NIC model for Third World Development since it shows the flaws in both extremes of the ideological spectrum of development economics - the neo-classical and dependency paradigms. The East Asian model shows that economic growth is not purely a matter of endogenous change and neither can it be duplicated and mechanically applied to the differentiated and stratified countries that compose the "Third World", itself a hierarchical structure. These different stages of development within the underdeveloped countries pose similar problems for the more radical dependency theorists. Though their central insight that it is of little benefit to study "Third World" development in isolation from the growth of the advanced societies is correct, they neglect the possibilities for a small number of countries, espousing social and political fidelity to the doctrines of the advanced nations, to make limited advances in eras of world economic prosperity and expansion. Impressive though the material developments of the NICs have been, the economic inequalities, instabilities and susceptibilities embodied in these achievements should not be overlooked.

IMPORT-SUBSTITUTING INDUSTRIALISATION

One of the main tenets of the structuralist school, and in particular the

Prebisch-Singer thesis, was that the under-development of the Third World was due to its reliance on exports of primary products, which were subject to terms of trade that both fluctuated in the short-term and deteriorated in the long-run. Basically, the thesis stated that the income elasticity of exports from the periphery was less than one while the income elasticity of imports to these "satellite" states was greater than one. This was a major justification for import substitution behind tariff walls which would, it was expected, reduce these countries dependence on foreign manufacturers and thus on the industrially advanced countries. This was not, though, a recipe for autarky, but for what Prebisch called "healthy protectionism".

There were, however, a number of problems with the attempt at ISI. In addition to the increasingly rigid import requirement, there were a series of problems relating to market size. The technology available to the underdeveloped countries was that developed in the advanced nations where labour was expensive and capital relatively cheap. In the Third World, on the contrary, cheap labour was abundant and capital was expensive. The technologies available tended to invoke massive outlays on capital, and employed very few people. Little research was done on types of technology appropriate to the factor endowments of the majority of Third World countries.

For these and other reasons, the policies designed to secure rapid industrialisation via the substitution of imports was not very successful: rather its "achievements" were increased balance of payments problems, increased foreign penetration of the economy, rising unemployment, widening rather than narrowing income differentials, greater vulnerability of the economy to cyclical movements, a continuing dependency on the import of a limited range of raw materials or agricultural products, and limited fluctuating industrial growth. Consequently, there was widespread disenchantment with ISI right across the ideological and analytical spectrum.

EXPORT-ORIENTATED INDUSTRIALISATION.

"The notion that it is necessary to have a well established and integrated industrial structure before developing substantial manufactured exports is not supported by experience. A clear distinction can be made between those economies (South Korea, Singapore, Taiwan) that adopted export-orientated policies once the first easy stage of substituting domestic production for imported non-durable consumer goods was completed, and a second group (Argentina, Brazil, Columbia, Mexico) which continued with ISI beyond the first stage but were faced with increasing difficulties and economic inefficiencies as the substitution process involved more capital intensive, technologically sophisticated products, frequently characterised by large economies of scale and capacity requirements which could not be met by domestic demand".(Fitzpatrick and Nixson, 1983)

The neo-classical interpretation of the ISI experience is based on the standard international trade analysis, where economic welfare is maximised through the optimum allocation of scarce resources, which is achieved by international specialisation and exchange based on the law of comparative advantage. However, I believe that the alleged superiority of EOI is not so much due to the adoption of these "rational" market-orientated policies, but rather to a combination of cyclical and historical factors and to substantial discriminatory state intervention. It must be remembered that the export and growth success of this limited number of NICs from the mid-1960's to the mid 1970's occurred in a time period, which by the experience of global industrialisation, must be viewed as in the short-run. It also took place in a historically unprecedented age of reasonably full employment in the major advanced economies, high rates of industrial growth and a virtual explosion in world trade. Besides it occurred within a series of social formations which were country, temporally, and geographic specific.

There remains a vast difference between the level of manufacturing output per head of population in the most retarded of the advanced industrialised countries and even the most statistically industrialised of the underdeveloped ones. Therefore, while the definitions based on sectoral share show South Korea to be as industrialised as the UK, the difference between the two countries' levels of manufacturing output per head (1978) is between $621 and $2667. Of the NICs only Singapore has a higher level of manufacturing output per head than some industrialised countries; and that is an unfair comparison given that Singapore is a city-state without a hinterland or rural sector.

THE PRIMACY OF THE STATE

"Inherently, the forms of pervasive state intervention which underline the NIC success stories imply a set of policy instruments which lie outside the range of neo-classical policy analysis since they usually require forms of direct intervention which rely on highly specific social structures and social relations for their success". (Evans and Alizadeh in JDS, 1984)

A closer investigation of the NICs - with the possible exception of Hong Kong and Singapore - reveals far less reliance on the invisible hand guided by enlightened market orientated economic policy than is portrayed in the neo-classical interpretation. Indeed, amongst the internal factors, the role of the state is perhaps the most important. In South Korea, government strategy has not been characterised by purely neutral free trade. Throughout the 1960's the government used an array of interventionist measures, often on a hyperselective basis, and the period is more accurately characterised as one of export promotion rther than across-the-board liberalisation of the trade regime. In 1980, when liberalisation was implemented, it was impelled by the US government as a quid pro quo for retaining access to the American market. The export incentives of the 1960's were maintained in the more turbulent following decade by periodic devaluations in the won and changes in the allowances which offset the effect of domestic inflation in excess of the world rate. Although this age of export promotion was accompanied by some gradual relaxation of import controls, the state maintained a complex array of import quotas and restrictions aimed at encouraging import substitution in isolated areas - steel, non-electronic machinery and fertiliser.

In the case of Taiwan and the Latin American NICs (Brazil, Mexico and Argentina) the state has similarly pursued an active, selective and interventionist role though admittedly not as pervasive or strategic as the South Korean case. "The policies followed by the successful outwardly orientated nations has not been to dismantle the edifice of tariffs created by previous policies. Instead they have added to the edifice various measures designed to promote exports" (Rotemberg, 1977)

Hong Kong appears at first a striking contrast to South Korea and Taiwan and the closest approximation to the neoclassical model. It must, however, be borne in mind that the city is both very small and has been for most of its history, the protected colony of a dominant world power, Britain. It is increasingly dominated by the Peoples' Republic of China, operating as a kind of very large export processing zone and offshore banking centre. Both the relationships, to Britain and to China, make Hong Kong a very special political case rather than a neoclassical textbook prototype.

Further, the crucial role of the state in South Korea further violates the "comparative advantage" idea inherent in the neoclassical international trade analysis. Though it is true that the foundations of high growth were in garments and textiles, it is most difficult to envisage South Korea's comparative advantage in two of its most spectacular successes, shipbuilding and steel. These industries are after all capital intensive and ostensibly characteristic of a capital abundant economy. By financing company expansion in the face of declining demand and low capacity use, obliging companies to adopt a specific pattern of specialisation

and coercing mergers and a cartel to reduce domestic competition, the government and not the operation of a free world market made all the difference. "While the backbone of export performance of South Korea might be attributable to a genuine comparative advantage the second generation of growth industries seemed more likely to be the products of government gambles" (Harris, 1986, p.41)

THE CONTINGENCY OF THE GROWING CAKE

The warnings issued by the more pessimistic writers that the market prospects for UDCs' manufactured exports depended heavily on the continued buoyancy of, and lack of restrictions on access to markets, in the advanced capitalist economies (which absorbs over three-fifths of total UDC exports of manufactured goods) have been borne out given the slower economic growth in the advanced countries and the understandable offshoot of this - heightened protection - over the past decade or so. The 1970's saw the tightening or new imposition of trade barriers affecting developing countries exports of manufactures such as textiles, clothing, footwear, television sets and shipbuilding. One of the major shortcomings of the 1979 Tokyo Round of trade negotiations was its failure to reach agreement on a "safeguards" code limiting the enactment of quotas on voluntary export restrictions and imports causing domestic dislocation.

The favourable market conditions for the export policies of the NICs during its "golden age" are perhaps best underlined by the rapid expansion of world trade; growth rates of international trade peaked to an exceptional 18% per year between 1967 and 1973. These were exactly the years in which the NIC's scored their greatest successes. The international context for the rise of the NIC's was further facilitated by their easy access to finance. A buoyant transnational banking market developed over the 1960's and 1970's specialising in borrowing and lending currencies outside the country of issue (the so called Eurodollar market).

The effects of world wide recession upon the NICs has been dramatic; Brazils cumulative debt increased alarmingly from $12.6bn in 1973 to $96bn in 1984. For Mexico, the GDP declined in 1982 and 1983 (by -0.5% and -4.7%), manufacturing output went down even further (-7.6% and -14%) and gross investment still further (-16.4% and -25.3%). Real wages officially fell by about a third over two years, and some 1.2million jobs were said to have been lost. Neither did the "gang of four" escape. 1985 saw Singapore's growth fall disastrously (-1.7%) as the US economy slowed, cutting Singapore's exports, exports elsewhere did badly because Singapore's dollar, tied to the US currency, appeciated in value through 1985. In South Korea, the GNP contracted by nearly 6% in 1980 (compared to an average growth rate of 9.2% between 1962 and 1979). The debt - $37bn in 1982 - was projected to reach almost $65bn by 1986. This increased instability and dependence of the NIC's upon the international market is exemplified in the 1984 decision of President Reagan to reduce the share of the domestic market taken by imports from 25.4% to 20.5% and allocating to Japan, Europe and Canada all but 6.5% of the market.

DEPENDENCY THEORY AND THE NICS.

"From a dependency perspective, it seems relevant to ask whether it is not strange that the implicit trade-off between 'freedom' and 'material benefits' seems to undergo some remarkable transformations within the policy debate. It has been common to argue that if the 'socialist' alternative could produce the material benefits, it remained unacceptable because of its costs in 'freedom'. Many who were fond of that argument are now found among those who extol the NICs on the grounds that they have produced the material benefits" (Bienefeld in Seers, 1981, p93)

For dependency theorists, who stress the limits of capitalist development in

the periphery, the impressive material developments of many NICs represents a considerable challenge in that they assert generally, the prime importance of internal policy, the adequacy of market signals as guides to efficient resource allocation and the generating of external economies in the course of industrialisation. Bienfeld, however argues strongly against characterising the NICs as the embodiment of the neoclassical parable and puts forward an alternative view. The emergence of the NICs is seen as a response to a set of international circumstances which at one and the same time produced relatively favourable access to the markets of the advanced countries, dramatically increased access to international finance and increasing relocation of production by MNCs to the periphery. These factors are seen as having conditioned the emergence of NICs but not as having determined which countries would seize the opportunities. The view is this was determined partly by location and geo-political significance, partly by the existence of a strong repressive internationally reliable regime, and partly by the existence of a technological infrastructure resulting from earlier import-substituting policies.

The tremendous technical and industrial achievements of South Korea's neighbour, the Democratic People's Republic of Korea has many implications, the most important for the purposes of this essay being the importance of resource endowments, (both countries being exceptionally well blessed) a favourable geo-political position, that the Soviet model can't readily be discounted as an industrialisation option and corollary of this that export growth is not the only path to industrial development.

CAN THE NIC EXPERIENCE BE GENERALISED?

"Whether or not aid per head of the population on the Korean level could be extended to all developing countries, it seemed most unlikely that the world could absorb a comparable volume of exports. If China had exported at the Korean level of exports per head, Chinese exports would have to increase 2512 times (or 42% more than all the exports of all developing countries). China and India together would have produced exports equal to half the value of the world trade" (Harris, 1986, p31)

The failure of Trinidad and Sri Lanka despite their commitment to rapid accumulation and "openness" provides valuable insights into the application of the NIC emulation across such a broad category as "developing countries". The crucial point in assessing the practical viability and theoretical implications of such models is that they are imitated or applies across countries with radically different endowments, regimes, cultures etc. In this respect it is apparent that Trinidad and Sri Lanka have more in common with many other Third World countries (e.g. the more dominant role of the MNCs in the Third World at large vis-a-vis the NICs) than the models they seek to emulate, particularly in the relative absence of indigenous capital and a native capitalist class.

Even if one accepted the neoclassical position, I believe there are serious obstacles to the NICs maintaining their success in export expansion and even more so for other countries emulating them. Cline's fallacy of composition essentially states that while the model may work well if pursued by a limited number of countries it would breakdown if pursued, at the same time, by a large majority of developing countries, since the resultant outpouring of manufacturing exports would provoke a protectionist response from the Advanced Countries. "The generalisation of export-led development across all developing countries would result in intolerable market penetration into industrialised countries" (Cline, 1982, p88)

Generalisation of the group of four export strategies would require LDC exports of manufactures to rise seven-fold implying an increase in their share of industrialised countries manufactured imports from approximately one-sixth to approximately four-fifths. To the extent that the NICs have followed open trade policies and realistic exchange rates other developing countries would be well

advised to adopt similar policies but ill-advised to expect free market policies to yield the same results that were achieved by the East Asian model economies, which took advantage of the open economy strategy before the export field became overcrowded by competition, and did so when the world was in a phase of prolonged buoyancy. "It is important for other LDCs to consider both the supply side and demand side effects of export promotion strategies" (Chow, 1987)

CONCLUSION.

As well as the important historical, cyclical, geo-political and size factors which allowed for the success of the NICs and mitigate against their emulation on a large scale it must further be remembered that although the aggregate share of NICs in the total OECD imports of manufactures has steadily risen since the mid 1960s, it remains below 10%. Typically, neither will export promotion benefit the developing country, if its main exports terms of trade are in decline. This is also applicable to the asymmetrical penetration of the MNC. The strong bi-directional causality between export growth and industrial development (and their failed emulators) is unlikely to "prove" or "disprove" any particular theory of development. However, the NIC experience does compel a more painful confrontation with reality than dependency theorists have, up to now, been willing to undertake by making more awkward the recitation of cliches and rhetoric about blocked development, stagnant peripheries and so on. The same applies to the neoclassical school which increasingly finds it difficult to extol the virtues of South Korea, Brazil, Singapore or Taiwan as the triumphs for the free play of market forces, when in fact they are among the more corporate, planned and repressive economies in the world.

Gerard Considine

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Perestroika

Mikhail Gorbachev came to power in the Soviet Union preaching especially, Perestroika or reconstruction of the economy. For nearly five years he has attempted to invigorate the soviet economy by applying a bewildering array of unorthodox approaches and new methods of management to the old Stalinist system of central planning. Despite this, the soviet economy is on the verge of collapse. Perestroika and Glasnost for us in the Western World has signified a new era behind the iron curtain, for the people of the Soviet Union, it has meant rationing, shortages and long queues for the most basic goods and watching others getting rich quickly in co-ops by essentially reselling state goods at a higher price. Quite simply, efforts to restructure the economy have floundered. This essay is an attempt to analyse Perestroika, what it involves, why it has failed so far and what steps must be taken in the future to ensure its success.

Perestroika is not an isolated reform process, it is one part of a three pronged process of change, the other two being - Glasnost and democratization. However it is Perestroika that gives real meaning to what would otherwise be the hollow rhetoric of Glasnost. It is not, however, about returning to Capitalism or even abandoning central planning, it's merely a relaxing of its rigidity. A type of trimming of the bureaucratic part that exists. Its aim is to create a centrally planned economy with a modern industrial base, which takes account of local initiative and enterprise.

Perestroika is certainly a radical reform process but it does not involve rapid changes. Gorbachev envisages Perestroika as occurring in several 'waves' over a period of twenty to thirty years. It was the 27th party congress that gave the first general outline of Perestroika. There were to be three stages of Perestroika (1) the preparatory stage from 1985-1987. This involved improving labour and social discipline, an anti-alcohol and corruption campaign and new laws on quality control in factors, supervised by Gospriemka. The laws on co-ops were changed to allow for greater scope for collective bodies. The plan also included massive investment in new technology and moves to democratize the work place, with the election of managers from 1987. Moves on joint ventures and foreign trade contracts were also invited.

Stage 2, the transitional stage, was intended to be from 1989 to 1990. However much of it is running behind schedule. It involved increasing enterprise autonomy, with two thirds of all state enterprises moving to cost accounting, with a profit making goal. This quite simply hasn't happened. Stage 2 was also to have included a trimming of the central bureaucracy. This has only really been started. In theory about 50% of all ministerial staff was to be cut in 1989-90. There is no real evidence of this happening. It is in the whole area of price reform that the stage has really fallen behind however. Soviet prices are based on costs of production not on demand. This system is outdated and must be changed. Milk and meat prices were last increased in 1962. It is estimated that if supply and demand were allowed to balance prices would increase by 49%, a phenomenon known as "repressed inflation". This would obviously create discontent among the people, but it is a step that has to be taken if Gorbachev is really serious about restructuring the economy. To put it bluntly, Gorbachev has flunked it on the whole issue of price reform.

Agricultural reform has taken place to some degree. This is an extremely sensitive area for Gorbachev, as collectivisation is seen as one of the key tenets of Marxism-Leninism. In March 1989 new laws permitting family farming under 50 year renewable leases were pased. An indication of just how inefficient the agricultural system is, can be shown by statistics on output in the sector. The 3% of soviet arable land that is privately owned accounts for 30% of total output. The new legislation is only a short term solution however, and little has been done to tackle the infrastructural problems that lead to the loss of 30-40% of output.

Stage 3 of the plan was to have been the "take off". By 1992 it was hoped that the economy would be working according to plan and an acceleration of growth would occur, with the aim being to double GNP by the year 2000. Quite obviously this just is not happening. Immense problems have emerged. There exists in the Soviet Union a motivational crisis. That is understandable under the circumstances. Why should people respond positively to promises of long term benefits, when in the short term living and working conditions deteriorate. Perestroika will be judged on whether or not it can put food in the shops: Gorbachev's solution to the crisis has been to introduce Glasnost and ever increasing moves towards democracy, but up until now this has appealed more to the intelligentsia than to the working class. The retail sector is in disarray, prices are low but the goods are of poor quality and long queues exist for the most basic of commodities. Gorbachev has recognised the problem and has increased the importation of consumer goods and food, this has caused balance of payment, problems, and Sitaryan, the new foreign trade supremo, has called for import limits to be introduced.

Room for manoeuvre in spending is further curtailed by the 120 billion roubles budget deficit which Pavlov the finance minister hopes to halve in the next year through defence cuts and the issuing of government bonds. Pavlov has stated that a money market will be introduced in the Soviet Union this year and that capital expenditure will be cut in an effort to tackle consumer goods shortages.

Gorbachev's united decentralization process has also caused problems. In the short term anyway it will strengthen the hand of local party officials. Therefore unless there are wholesale personnel changes there is potential for greater obstructionism and inertia in the system. It also seems to have stirred up a hornets nest of nationalist passions. Nationalism of the like we have seen recently is a very real threat to Perestroika. The economic structure of the Soviet Union is glued together by a high degree of specialisation in different regions, deliberately done to make them interdependent. The Soviet Union can survive without the Baltic Republics but the secession of Azerbaijan for example would seriously undermine Gorbachev and his reforming policies.

The motivational crisis I spoke of is further exacerbated by a cultural inertia. The old culture whereby the people were bolstered by the state with no incentives for working hard or efficiently will be difficult to change. Gospriemka rejected six billion roubles worth of goods last year which were unable to reach the required standards. Furthermore, the introduction of new technology means the workforce has to be completely retrained. The new co-ops allowed, in an attempt to overcome shortages, have been obstructed by local authorities and there is popular resentment and discontent at these profiteering "Yuccies".

Probably the biggest obstacle to Perestroika is the number of people who stand to lose by its completion. The conservatives in the party, led by Ligachev, who, significantly, still remains in the Politburo, have objected on ideological grounds. They oppose family farming and fear that reform, if it is carried too far, will lead to social disorder. The current nationalities problem strengthens their view. There are various other groups such as the bureaucracy-millions of Brezhnev-created civil servants who are hampering Perestroika to protect their own interests, and the military who will lose. Even the working class are losing out in the short term.

The combined effect of these obstacles to Perestroika have brought the Soviet economy to a virtual standstill with industrial unrest and dislocation of the old planning system. Agricultural output declined by 2% in 1989, inflation is at least 10% and some economists claim that there was actually negative growth in the economy last year. 13 million of a workforce of 164 million (8%) are unemployed. Unsatisfied demand was estimated at 115 billion roubles. Wages increased by 9% whereas labour productivity improved by only 2.5%. Labour discipline, one of the fundamental aims of Perestroika, reached rock bottom with

seven million workdays lost through strikes. The recent coal strikes will, according to some estimates cost the economy 100 million roubles. The promise during the resulting negotiations of price increase will have to be passed on to other industries despite the fact that the government is committed to freezing prices. This means a further increase in retail price subsidies will be introduced thereby compounding the current budgetary problems. The reorganisation of the Soviet oil and gas industry with new decentralising decision-making has led to chaos, and there has been a fall in output in both. The crisis in the oil and gas industry mirrors the dislocation of the rest of the Soviet economy.

The two biggest ailments of government finance are the huge budget deficit and the failure to obtain an adequate return on investment. The entire state investment programme must be reviewed from scratch. An example of the inefficiency of the programme exists in the coal industry where one third of all investment is in the declining Donbas mine. The productivity of the Kuzloas mine is three times higher, but no deep mine has been dug there since the 1960's.

Some economists argue that enterprise sales should be introduced with cross shareholdings eventually traded on a stock exchange, which would be an effective way of increasing the efficiency of investment. An essential first step however, is the abolishment of the two tier price system and the introduction of a progressive tax system (as opposed to the current universal 13% rate). Indirect taxation is also a thorny issue. It should be linked with reform of retail prices now apparently scheduled for 1991.

Perestroika is at a crossroads now. Gorbachev's new blueprint which includes the abandonment of the party monopoly seems to suggest that more radical reform is on the way. Certainly, if Lenoid Abalkin's radical plan, on where Perestroika should be taking the Soviet economy, is eventually adopted, the original boundaries of Perestroika will have been breached and the Soviet Union will be on the road to a market manifesto for social democracy. Abalkin pulls no punches in his criticism of Perestroika to date. "We have not met any of our projected results over the last four years, we must give up this dogmatic misconception that income from property is incompatible with socialism". He proposes a phased timetable for transition to a new financial and banking system, the introduction of a capital market, the removal of subsidies from loss making state enterprises and collectives and the introduction of a comprehensive social security policy to protect the poorest from the effects of inflation.

However the current government programme stops short of Abalkin's plan due to fears of "serious socio-economic upheavals". Price reform has been postponed. Reform still remains within the parameters of the old planning system. But it has become increasingly obvious that this is insufficient to solve the Soviet Union's woes. The government must have more of a function of regulation than planning. Personnel changes must be continued. Plans continue to go astray as Gorbachev depends on the bureaucracy to implement reforms. They are obviously loath to do so as they have their jobs and privileges to protect. These planning bodies must be restructured.

I feel it is virtually certain and necessary that privatisation will occur in the Soviet Union. However it will be a slow process and doubts must exist as to whether people will buy shares. Nevertheless shares could be made eligible to all with money coupons used for bidding. The shareholders could elect a board of directors who would appoint managers. They would be given 10% of shares with the understanding that they would only see them after five years, thereby acting as a disincentive to quick profits at the expense of long term expansion. By doing this the government would be establishing specific owners of enterprises instead of owners of the whole industry under the nomenclature. If the government was to liberalise domestic prices and the exchange rate without doing it, it would lead to rampant inflation. This privatisation is essential both in industry and in agriculture. More autonomy is needed to revitalise production.

The amazing paradox of Perestroika is that great central control is required to achieve the major decentralisation of economic control and power. If Gorbachev succeeds he will lose his centralised power to forces that could undercut the political authority of the regime (William Odom). Despite this, I have no doubt that Gorbachev has moved on from his early desire for limited reforms. He certainly wavered. But for this to survive there can be no stopping now. Perestroika has acquired a wide scope and become a necessity for the people, but the forces against it are still strong. Gorbachev is being attacked by the left, the right and also the general public, but Perestroika will survive because there is no coherent programme to replace Gorbachev's policies.

Shane Coleman

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The Population Explosion in LDC's

"The basis for an effective solution of population problems is , above all, socioeconomic development."
First World Population Plan of Action, Bucharest

INTRODUCTION: A REVIEW OF NUMBERS

The explosive acceleration in world population growth is a relatively recent phonomenon, dating back to the beginning of the 1950's, and one which is to be associated almost exclusively with the less developed countries of the world.The annual rate of population growth in the Third World has tripled in thirty years and is currently running at 2.4% per annum with the result that by the year 2025, 8.3 billion people will inhabit this planet–four-fifths of them will reside in the developing nations.

This alarming rate of population growth can be explained primarily in terms of a rapid transition from a long historical era characterised by high birthrates and deathrates, to a new demographic regime in the post-war period, when the introduction of modern medical and public health technologies has led to a dramatic decline in deathrates , while birthrates are only beginning to fall from their historic high levels.In the 1950's the average person in the Third World could not expect to live longer than 35 to 40 years, by 1980 life expectancy had increased to 56 years (a gain of 42%), and only 10 years short of the average lifespan in the developed world. Birthrates, in contrast, are very high–30 to 50 per 1,000 compared with a rate of less than 20 per 1,000 in the developed countries.

THE POPULATIONS DEBATE: SOME CONFLICTING OPINIONS

There is wide room for debate with regard to how serious a problem is population growth in the Third World. According to one line of argument rapid population growth stimulates development. Advocates of this view maintain that more people means a higher level of consumer demand which in turn generates economies of scale to production, and provides sufficient and low-cost labour supply to achieve higher output levels. The American population revisionist of the counter revolution school, Julian Simon (1981), argues more people means more ideas and more geniuses:'The ultimate resource is people-skilled, spirited, and hopeful people.'Indeed, this is a lesson that many Western nations have had to learn in recent years as population has slowed down. However, there is nothing to suggest that to capture the benefits outlined above, a 2-3% annual rate of population growth is necessary. Hicks in 1939 estimated that the necessary stimulus to the profound economic change at the time of the Industrial Revolution in Europe was provided by a rate of population growth below 1% per annum.

Within the less developed countries themselves, the 'population-growth- is-desirable' viewpoint is often upheld. Demographers tell of an African leader who(supposedly) began a speech warning his people against the dangers of overpopulation:'My people, our birthrate is so high that our numbers will double in 25 years....' Wild cheering drowned the rest. That population growth should provide such cause for jubilation can be explained primarily in terms of the Third World's perception of additional numbers as a source of military and political strength. Hence Iraq's attempt to increase fertility rates in the war with Iran.

At the other extreme, there are those who identify large population size as the major crisis facing the Third World today. This view of population growth and its implications can be traced back to Thomas Malthus, who predicted that population growth would outstrip food supply resulting in the emergence of world food catastrophes and ecological disaster. Malthus' predictions were ,however, never realised since he failed to foresee the power of technological progress in

increasing the productivity of land , and offsetting the growth inhibiting forces of rapid population growth. However, it is now widely felt that we have nearly reached the limit of the world's ability to feed even our present numbers adequately, and it is feared that if agricultural reform does not take place on a large scale within the Third World in the near future, then in the race between population and food supply, population might yet win.

In the 1970's and 1980's, an intermediate position between the two extremist views outlined above seemed to be reached.According to the modern view, population growth is not to be regarded as the underlying cause of low standards of living in the Third World, but rather as a symptom of underdevelopment. Empirical studies have shown, that one of the most important means by which the impoverished majority in the developing countries can secure their survival is by having many children. Children provide an important source of labour and income for their parents in the developing world. Additionally, the provision of financial support by children in parents' old age is highly valued. Weighed against these 'income' and 'security' benefits, the costs of child-rearing appear negligible, not only in terms of maintenance costs but also in terms of the opportunity cost of a mother's time since, having restricted access to educational and employment opportunities, womens' income-generating capacity outside the home is limited.Given the high ratio of expected benefits to costs which applies, this theory of high fertility rates postulates that children are regarded as net economic assets by their parents in the Third World.

Large family size must also be explained by reference to the social structures and the traditions and customs in the developing countries. In this regard, it should be noted that there are many ethnic and racial groups whose attitudes favouring large family size have to be protected for both moral and political reasons. The dominating influence of religion is also of crucial significance here, with many faiths (Catholicism, Buddhism, Islam) opposed to the use of contraception.

Although now widely felt that population growth is not the overriding problem in the Third World, development economists today are not so naive as to deny that large populations serve as an intensifier of conditions of underdevelopment in the poor nations. After all, more people means more mouths to feed, more bodies to clothe, more people looking for work, higher youth-dependency ratios, an increased rate of rural-urban migration which in turn exacerbates the problems of urban unemployment and fuels the explosive growth of the cities. Associated with this rapid rate of urbanisation has been the prolific growth of slums and the intractable problems of pollution and waste disposal. At present, metropolitan Cairo is attempting to cope with a population of 10 million people on a water and sanitation system built to service 2 million!

Of utmost importance, however, is that one recognise that the impact of population growth varies significantly from country to country in the developing world,depending on economic, political and social structures. In Hong Kong , Malaysia , Korea, Singapore and Thailand where economic performance is good, and quality and availability of health and educational, as well as other public services has improved, population growth has to a large extent been accomadated. However, for the majority of developing nations where people live in unacceptable conditions, in terms of absolute poverty, malnutrition, unemployment and limited access to public services, population growth places a large burden on society. Hence the desirability of the development of policy solutions to secure a substantial reduction in Third World population growth rates is largely recognised.

SLOWING POPULATION GROWTH:

In over 30 less developed countries a short-run solution to excessive rates of population growth has been sought in the manipulation of economic incentives and disincentives designed to change peoples' decisions regarding marriage and

family size. Incentives aim to encourage the use of birth-control and might include the provision of tax-relief, the payment of subsidies, and preferential treatment in the allocation of housing and school places for small families. Disincentives, typically, involve the the withdrawal of social benefits and the imposition of financial penalties where the number of children exceeds a given maximum.

Unfortunately, all too often, such programmes designed to alter the cost to benefit ratio of having children, have been abused both in their execution and their design. India, where a sterilisation scheme in the 1970's evolved into an involuntary, coercive programme, is a case in point. The most infamous incentive/disincentive programme-'The One-Child Scheme'-was introduced in China in 1982. The scheme has proved successful but, as in India , only at the cost of personal freedom, and thus its widespread applicability to most developing nations is questionable. Confidence in such schemes should not ,however, be lost at this point. Incentives and disincentives ,where carefully designed, can meet the criteria of improving welfare and allowing free choice. Indeed, in Singapore,where such a scheme has been introduced on a fairer and more equitable basis, the results have been impressive.

Traditionally, the developed countries have tried to come to terms with the population problems of the Third World through the introduction of family-planning programmes. This approach to population problems in the Third World has not ,however, met with the results that were hoped for. This is because this traditional policy for population control attempts to work on the population variable per se, rather than trying to alleviate the conditions of poverty and underdevelopment which have given people the motivation to have large families in the first place. As pointed out by the health and family-planning minister, Dr. Koran Singh, at the World Population Conference in Bucharest in 1974: 'The best contraceptive is development ".

Development strategies that are going to provide good results must be comprehensive, involving the reorientation of social, economic, and political structures, as well as radical changes in attitudes and popular beliefs. A crucial element of any strategy for development must be the effort to raise the economic and social status of women. This can be achieved by increasing female access to educational and employment opportunities, and economic dependence on men can further be reduced through the guarantee of rights of inheritance, marriage, divorce, litigation, and property to women. The integrated development of the rural sector, involving the reorientation of economic activity and social investments to the rural areas, thereby curbing the rate of rural-urban migr ion, would also play a central role, in so far as this would achieve a more equitable distribution of population within the developing nations.

As the transition to a richer, more modern society is made, it follows that fertility rates will fall, as the ratio of the expected costs of having children to the benefits increases, and peoples' perception of the economic utility of having children changes. Indeed, in the developed market economies today, where per capita income levels are high, and a social security system is in place, a child's contribution to family income assumes little , if any importance. Similarly the 'security' benefit is largely irrelevant. On the other hand , in the Western world, where children enjoy a high standard of living, compulsory education applies, and women are liberated, the costs of child-rearing, both actual and opportunity, are substantial.

Additionally, it is argued that development will be associated with an increasing flow of new goods and new ways to spend money. In other words, a wider range of consumption possibilities will be available which can substitute for expenditure on children.

That efforts to achieve the goal of socioeconomic development will be associated with fertility decline, is evidenced by the experience of several developing countries. For example , in Sri Lanka and Thailand between 1965-75,

where income gains were distributed evenly, and where radical reform in social organisation took place, birthrates declined at a rapid rate. The experiences of Hong Kong, Brazil,and Venezuela in the 1960's illustrate that an economic dynamic in a country may, in some cases, be enough to bring birthrates down. However, it should be noted that in the former case where development was perceived as a multidimensional process, and not simply in economic terms, the fall in birthrates was significantly more impressive.

The developed world could be of considerable assistance to the poorer countries in the attainment of their development objectives. Such support would not only consist of expanded financial aid, but also of improved trade relations, better international commodity pricing policies, more appropriate technological transfer, and moderation in the developed countries high consumption standards in order to achieve a more equitable sharing of the world's resources. Evidence shows that there still exists a large unmet demand for contraception in the Third World. A survey of married women found that 46% in Peru had not wanted their latest child, 37% in South Korea, 34% in Sri Lanka. An increase in financial assistance from the developed countries for family-planning programmes is thus also seen as desirable in a policy for population control ,along with an improvement in the organisation of the distribution of information and birth-control devices. Finally, the rich countries can help by making available to the less developed countries the 'safety-valve' of emigration which helped ease their own population pressures at the time of the Industrial Revolution .

CONCLUSION

Change can , however, only come gradually. Even once the brakes to population growth have been applied, population will continue to grow for a long time before levelling off. This is because the potential parents of the next generation have already been born, and given that these young people vastly outnumber their own parents, population growth has a built in tendency to continue even once the impact of a development strategy has been felt.

Although, undeniably, many difficulties lie ahead, demographers maintain that the population explosion is over, and that birthrates are starting to come down. Studies show that even in poverty-stricken black Africa e.g. Kenya, Botswana, and Zimbabwe, there has been a dramatic increase in the use of contraception and fertility rates are declining.

Population growth trends into the future will depend crucially on the extent of the commitment within the less developed nations, and within the international community as a whole, to population control programmes as part of an effort to improve peoples' lives. As expressed so aptly by A.W. Clausen of the World Bank : "What governments and their people do today to influence our demographic future will set the terms for development strategy well into the next century."

Sophie Bury

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A Note on Disequilibrium Dynamics

INTRODUCTION:

The classical market clearing model, first expounded by Walras and later developed by Arrow, Debreu and Hahn, purports to make precise Adam Smith's "invisible hand" showing how there is "[a] remarkable degree of coherence among vast numbers of individuals and seemingly separate decisions about the buying and selling of commodities".

In these equilibirum models, which I will call Walrasian, price taking agents recieve explicit price signals which are sufficient to generate (notional) demands and supplies. A vector of prices, then, will exist at which markets will be cleared; demand equals supply. At this equilibrium point, the non-existence of demand or supply constraints implies that the value of actual transactions is equal to the value of (notional) demands and supplies expressed. On a more general level, in an economy with n goods, the n dimensional equilibrium price vector ensures (by Walras' law) that the sum of excess demands is zero.

Several assumptions of this model, however, appear to be intuitively misleading, if not entirely wrong. If we accept that all agents take prices parametrically, thus leaving no room for any rational decisions with regard to prices as there is to quantities, Arrow points out that there will be no-one left to make a decision on the price. This effectively implies that agents make no use of the quantity signals sent to the markets because they can buy or sell as much as they want at the going price. The existence of cyclical variations in inventories and the fact that some firms in a recession seem to be in as "involuntary" a situation as the workers it must lay off, is sufficient justification that quantity signals do play a crucial role in the decision making process.

Perhaps the most controversial assumption is that of full price and wage flexibility. In reality the existence of information assymetries, liquidity constraints, price and wage "floors" (downward inflexibilities) and Keynes' marginal efficiency and expectations traps, which combine to create institutional constraints in the price adjustment process, provide powerful evidence against fully flexible prices and wages in favour of market rigidities. In all models, the cost of changing the present status quo with regard to prices and wages is regarded as a sufficient barrier against instantaneous price adjustment such that, at least for some interval it is more realistic to regard those variables as fixed and concentrate instead on quantity adjustments. This appears to be the justification for the Hicksian Fix-Price method.

Disequilibrium economics, then, tries to generalise the concept of Walrasian equilibrium by dropping the assumption of axiomatic market clearing and introducing more realistic price determination mechanisms ranging from full rigidity to full flexibility. Quantity signals are introduced and adjustment to equilibrium is achieved through price and quantity movements.In any case, "perpetuating the hypothesis of clearing markets (only) preserves the principle of conservatism and respect for the classical model", and any other justification is hard to find.

Keynes was the first to introduce the concept of quantity adjustments in equilibrium. He sought to alter the state of classical microeconomics with regard to real world macroeconomics. Patinkin drew a very clear distinction between Walrasian demand and supply and its constrained counterpart by showing how a firm would react if it could not sell all of its notional output. In particular, labour demand was shown to be a function of expected sales. Clower extended this by describing the spillover effect of disequilibrium in one market to another. Barro and Grossman then combined the works of Patinkin and Clower to generate the first fix-price model with quantity adjustments. In particular they demonstrated that the level of employment and the real wage may not always be inversely related. Yet another important development came from Leijonhufvud who

introduced information constraints and coordination problems into the trading process. Finally the more recent work of Benassy, Dreze and Negishi, have made more precise the non-Walrasian models of equilibrium by introducing important microanalysis.

There is an alternative response to traditional classical economics which assumes that markets are always in equilibrium i.e. instantaneous leaps back to equilibrium after any disturbance. These "Lucas-Sargent" models are essentially tatonnement processes where disequilibrium only occurs if demanders and suppliers face the 'wrong' price (false prices). If this occurs they will instantaneously try to recontract for goods and factors by changing prices. Is it reasonable to assume instantaneous market clearing? Well, only if one of the next two possible assumptions can be made.

(1) Buyers and sellers are omniscient in their knowledge about the world and their initial price/wage offer is the required market clearing or competitive equilibrium offer. Equally the institutions through which market offers and trades are made, must be immediately and effectively responsive.

(2) We could redefine equilibrium as disequilibrium (or vice versa). In this case however, we would only be studying disequilibrium economics under a different name.

The rational response to all of this is to regard disequilibrium economics as the more realistic interpretation of the real world and to try to model this.

NON WALRASIAN MARKETS WITH QUANTITY SIGNALS:

The following is a variant on Benassy's "non-clearing model". Consider an economy with a number of demanders and suppliers. Effective demand and supply by agent i for product v are d^*_{iv} and s^*_{iv} respectively. These do not necessarily match on any market.

However, regardless of 'effective' aggregates, on any market, actual transacted demand must equal actual transacted supply.

$$d\sim_{iv} = s\sim_{iv}$$

Therefore,

$$_i\Sigma d\sim_{iv} = _i\Sigma s\sim_{iv} \qquad \text{for all } v \qquad (\text{"}_i\Sigma\text{" means summed over all i.})$$

Because some demands and supplies cannot be satisfied, we need to introduce some rationing process.

Define, $z^*_{iv} = d^*_{iv} - s^*_{iv}$, $\quad z\sim_{iv} = d\sim_{iv} - s\sim_{iv}$

where z^*_{iv} is effective net purchases and $z\sim_{iv}$ is actual net purchases.

But, $\quad z\sim_{iv} = f_{iv}(z^*_{iv}, \ldots\ldots\ldots, z^*_{nv}) \qquad i = 1, \ldots\ldots\ldots, n$

s.t.

$$_i\Sigma f_{iv}(z^*_{iv}, \ldots\ldots\ldots, z^*_{nv}) = 0$$

Actual net purchases by any agents are a function of effective net purchases on that market by all other agents, and the sum of actual net purchases by all agents in commodity v equal to zero.

From all of this, we can examine three fundamental properties of the disequilibruim process.

(1) Voluntary exchange: This means that no-one on any market can be forced to trade any more than he or she wants.

$$d\sim_{iv} \le d^*_{iv} \quad , \quad s\sim_{iv} \le s^*_{iv}$$

or $\quad z\sim_{iv} \cdot z^*_{iv} \ge o \quad , \quad |z\sim_{iv}| \le |z^*_{iv}|$

That is, an agent is either unrationed, $z\sim_{iv} = z^*_{iv}$, or is trading less than he wants.

(2) Non-Manipulability: A rationing scheme is non- manipulable if an agent, when rationed, cannot increase the level of his transactions by increasing his level of demand or supply. Rationing which satisfy both non- manipulability and voluntary exchange, can be expressed as;

$$d\sim_{iv} = \min(d^*_{iv}, d\dagger_{iv})$$
$$s\sim_{iv} = \min(s^*_{iv}, s\dagger_{iv})$$

where $d\dagger_{iv}$, $s\dagger_{iv}$ are the upper bounds to demand and supply i.e. the

"quantity constraints" that each agent receives.

$$d\dagger_{iv} = \phi_{iv}(z^*_{iv}, \ldots\ldots\ldots, z^*_{nv})$$
$$s\dagger_{iv} = \phi_{iv}(z^*_{iv}, \ldots\ldots\ldots, z^*_{nv}) \qquad i = 1, \ldots\ldots\ldots, n$$

The demand and supply constraints are functions of the demands and supplies expressed by the other agents on the market.The suppliers recieve quantity signals from the demanders which are used to generate the upper bound on output. Likewise the demanders recieve quantity signals from supplicrs.

(2) Market Efficiency : We should not find both rationed demanders and rationed suppliers on the same market at the same time. This is not a necessary property. It implies that if both demanders and suppliers are rationed, they would be able to organise some exchange whereby at least one of them would no longer be rationed but both would be better off ,in a Pareto sense. Only the agents on the long side of the market will not be able to realise their transactions.

The rationing scheme will only be efficient or frictionless , if the difference between effective net purchases and actual net purchases has the same sign for all agents.

$$(z^*_{iv} - z\sim_{iv})(z^*_{jv} - z\sim_{jv}) \geq 0 \qquad \text{for all } i,j \quad i \neq j$$

If we did get a case where $z^*_{iv} - z\sim_{iv} > 0$, $z^*_{jv} - z\sim_{jv} < 0$, agent j would sell some of v to agent i and both would move towards their demand preferences.

If there is aggregate excess demand for v, no agent could be supplying less than he wants to. If there is aggregate excess supply, no agent could be demanding less than he wants to.

$$\sum_j z^*_{iv} \geq 0 \text{ implies } z\sim_{iv} \leq z^*_{iv} \qquad \text{for all } i$$
$$\sum_j z^*_{jv} \leq 0 \text{ implies } z\sim_{iv} \geq z^*_{iv} \qquad \text{for all } i$$

Therefore

$$\sum_j z^*_{jv} = 0 \text{ implies } z\sim_{iv} = z^*_{iv} \qquad \text{for all } i$$

Combining market efficiency and voluntary exchange, we get the "short-side rule" ; agents on the short side will realise their effective demands.

$$\left(\sum_j z^*_{jv}\right).\, z^*_{iv} \leq 0 \text{ implies } z\sim_{iv} = z^*_{iv} \qquad \text{for all } i$$

CONCLUSION:

In this essay, I have sought to describe several properties of the dynamic disequilibrium adjustment process by assuming that prices are not always fully flexible and that, as a result, quantities must adjust to bring about equilibrium. Disequilibrium Economics then, generalises traditional Walrasian economics by 'sacking' the auctioneer and, consequently, the assumption of automatic market-clearing. The implication of all of this is that any policy tool will only be effective and efficient if the particular state of the economy is conducive to the nature of the policy tool.

Disequilibrium dynamics in imperfect markets is a far more plausible interpretation of real world macroeconomics than traditional classical "statics". High unemployment rates, excess capacity and surplus stocks demonstrate the existence of the ubiquitous 'quantity constraints' on any market.Given the practical relevance of economics, any theory which seeks to approximate more closely to the real world should have a higher chance of offering a better policy prescription if it is set in a disequilibrium framework.

Ciarán John O'Neill

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Credibility & Stabilisation Policies in Ireland in the 1980's

The initiation of the exchange rate mechanism of the EMS in 1979 was a rare example of a policy regime change. The new policy rules for member countries were: (a) currencies were allowed to fluctuate only within a narrow band and (b) more fundamental changes in the value of a currency would entail a realignment of the entire system. It was hoped that the existence of this exchange rate discipline would lead to a convergence of Irish inflation and interest rates to German levels, in accordance with the predictions of purchasing power parity and interest rate parity theorems. Such a system of quasi- fixed exchange rates contains an inherent anti-inflationary bias as member countries compete to reduce their inflation rates to the level of the least inflationary member. In the EMS, Germany plays this anchor role so that the currencies of the other member countries are bound together in a DM- zone. It is in the context of this system that Ireland's attempts at stabilisation in the 1980s must be analysed. Between 1980 and 1985, the average inflation differential between Ireland and Germany was 9.4% and it is only in the last two years that the desired convergence has occured. This turnaround in economic fortunes is the motivation for this paper.

Recent evolution in macroeconomic research has been towards analysing the effectiveness of monetary and fiscal policies as the outcome of a dynamic game in which the government and the public are the players. The strategy chosen by each player is contingent on what it believes the other player will do. The existence of this strategic interdependence means that the effectiveness of policy cannot be predicted without reference to the response of the public to the announced strategy. This is important because of the existence of a time consistency problem. Consider the following scenario. The government regime announces in period t a sequence of policies it promises to follow in the next number of periods. The public responds by incorporating this new information into their decisionmaking concerning their consumption, investment and labour supply plans for the duration of the announced policy sequence. However, in period t + i the regime makes a surprise policy U- turn and the public realise it has been fooled. This ability of the regime to deviate from its announced strategy has the result that the public will heavily discount any announced policy sequence which it does not believe the regime will maintain. That is to say, is the regime trying to sell it a "lemon"?

In a number of economic situations, this problem of credibility presents serious difficulties. The most celebrated problem is the case of a disinflation strategy. If the announcement of a disinflation policy is not believed, reductions in the rate of inflation will entail a sacrifice ratio in terms of lost output and employment. On the other hand, a fully credible disinflation strategy can quickly reduce inflation with no output or employment costs as there will be a rapid downward revision of inflation expectations. This in fact creates a self- fulfilling prophesy dynamic which accelerates the speed of the disinflation. Sargent gives the example of the 1926 Poincaré disinflation "... as soon as he assumed control of the government, and even before his programme was enacted by the legislature, the Franc recovered and inflation stopped."(1)

The means by which credibility is established is for the regime to enter into precommitments which bind it to its announced policy time path. In the case of disinflation, one form of precommitment is to enact a constitutional limit on the growth rate of the money supply. Membership of the EMS may be regarded as offering a partial credibility bonus. However, the existence of the option to seek a devaluation does not make for a fully convincing anti- inflation reputation. In order that a precommitment be effective, it must contain a punishment clause if the regime deviates from its announced strategy. For example, the finance

minister might promise to resign if inflation rose above a certain level, a real- life instance being Nigel Lawson's statement that inflation would be his judge and jury.

I wish to focus on the role of fiscal policy as an effective form of precommitment to a disinflation strategy. This can be understood as follows. A budget deficit may be financed by issuing bonds or by printing money. The higher is the deficit, the greater the likelihood that the regime will resort to money creation as a financing mechanism, which has obvious inflationary implications. Similarly, the larger is the level of public debt relative to national income and more quickly is this ratio increasing, the greater the likelihood that the regime will at some future date resort to an inflationary strategy in order to reduce the real value of debt servicing commitments. This strategy is termed seignorage, or an inflation tax. This account explains the paradox that tight money in the current period is not inconsistent with an increase in inflation expectations (2). A number of results follow from this analysis. Firstly, a stabilisation policy has to be wide- ranging, involving fiscal adjustment as well as monetary restraint. As some unknown Polish economist put it " you cannot cross a chasm in two leaps". Secondly, the existence of such policy inconsistency (or Stackleberg warfare) means that the current inflation rate is not a particularly good proxy for inflation expectations. The existence of a large differential in yields between short- term and long-term bonds will indicate pessimism concerning the expected future trend of inflation. Thirdly, the maintenance of stable exchange rate link is only possible with a convergence in fiscal policies as well as in monetary policies. Roubini argues that an EMS member must replace the old inconsistent trinity of monetary independence, perfect capital mobility and a fixed exchange rate with a new inconsistent trinity of fiscal autonomy, exchange rate stability and capital mobility. (3)

POLITICAL ECONOMY ISSUES

The problems encountered by some OECD countries in implementing fiscal adjustment programmes during the 1980s (e.g. Italy, Belgium and Ireland) has led to a realisation that representative agent models, such as the tax- smoothing approach, are not always helpful in understanding the determination of the levels of the budget deficit and the public debt. In the case of stabilising the debt to GNP ratio, a conflict exists between different groups in society as to what corrective action is required. Workers who do not hold government bonds will favour a capital levy on bondholders. Bondholders on the other hand prefer a programme of fiscal adjustment. Some, may advocate outright repudiation. As it turns out, membership of the EMS overrides these conflicts. With capital mobility, a capital levy is impractical, and the reputational impact of repudiation would be inconsistent with continued membership of such an organisation. The only consistent choice is that of a fiscal adjustment programme.

The problem of terminating a sequence of high budget deficits should also be addressed using a conflict- scenario analysis. Strong associations have been found between high deficits and (a) short- term regime tenures and (b) coalition-type structures of government (4). The former correlation may be explained as follows. If a regime knows its likely time- span is short it has no incentive to cut the deficit, as it will not have the time to make up the resulting loss in popularity before the next election. This lack of incentive may be construed as the absence of a punishment clause, the regime being "forgiven" due to its short term of office. A coalition- type governing structure creates a classic prisoner's dilemma situation. Each party in the coalition has an incentive to maintain its own spending programme and seek cuts in the other's programme. Again the problem is the absence of a punishment clause, as each party may blame the other for the failure to cut the deficit. This creates a stalemate situation with no action being taken to reduce the deficit. The outcome of this analysis is that, firstly, political stability is a requirement for a successful fiscal adjustment programme.

Secondly, political cooperation is highly desirable. It has been a noteworthy feature of successful stabilisations that they have often been preceded by a period of great political crisis, as it was only in such dire circumstances that such a political consensus could be formed.

IRELAND'S STABILISATION.

The Irish macroeconomic experience has in the 1980's has become something of a case study in the literature (5,6). The large premium on long-term bonds over German yields prior to 1987 may be interpreted as a case of the policy inconsistency problem outlined earlier, as the FG- Labour coalition's anti-inflation objective coexisted with a sequence of high deficits and an escalation in the debt problem. In this way, reductions in inflation were achieved at the cost of large output and employment losses. The failed devaluations and large capital outflows, together with growing despondency, at the end of 1986 created the required crisis conditions. Thus, the incoming FF regime faced the task of constructing a credible stabilisation programme. It was helped by the emergence of a parliamentary consensus and the Programme for National Recovery agreement with the unions and employers created a more general social consensus.

These conditions enabled the regime to implement a successful fiscal adjustment programme. A credibility bonus was achieved by the removal of the policy inconsistency problem so that yields have converged to German levels. The anti- inflation objective was no longer incredible, with further reductions in inflation having no adverse impact on output and employment in the last two years. To some, this evidence suggests that a rational expectations approach can be a very useful policy analysis technique on occasion. Mr. Haughey has claimed that Keynes was the only decent economist; but his strategy since 1987 might suggest that he is a closet admirer of Messrs. Lucas and Sargent!

My conclusion, then, is that the credibility paradigm offers valuable insights into the problem of stabilisation. The importance of credibility should be thought of as a highly democratic state of affairs, as the outcome of government policies is dependent on the decisions of the public rather than being a matter of dictat.

Philip Lane

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Ricardo &1992

To begin with, Ricardo as a scholar and economist lived in a period when the political economy, still being a school of philosophical thought, lived in the shadow of a great philosophical tradition going back to Hume, Berkeley, Locke, etc. Locke proposed in 'The Leviathan' that men's actions were guided by an Adam Smith-like invisible hand which ought to maximize the utility of society, the sum of all men's enjoyments. Thus Smith's argument for non-interference in trade, based on the theory of absolute advantage, involved a degree of moral arithmetic. Ricardo's theory of comparative advantage was bound to carry these overtones. Consider the following: "The pursuit of individual advantage is admirably connected with the universal good of the whole ..... it is this which determines that wine shall be made in France and Portugal, that corn be grown in America and Poland, and that hardware and other such goods shall be manufactured in England." Thus one can infer that trade is primarily dictated by a natural law, augmented by other naturalistic factors. Ricardo states that "each country producing those commodities for which by its situation, its climate, and its other natural advantages .... by their exchanging them for the commodities of other countries" should add to the sum of labour's enjoyments and "be augmented by a rise in the rate of profits."

Such powerful claims required reinforcement, and so in my turn I will reiterate Ricardo's arguments. The model he used is familiar to us, namely the simple two country, two good, two factor model; the goods being wine and cloth, the countries England and Portugal, and the factors labour and capital. Both domestic markets in England and Portugal are perfectly competitive. Ricardo was of the opinion that "the profits of the favoured trade will speedily subside to the general level" because "capital will naturally flow into .... advantageous trade". Ricardo asserts also that the variable factors of production, labour and capital, are both immobile. This can be inferred from the following quotation, given in reply to there arising a possible scenario whereby "wages should rise and profits fall, it would not follow that capital and population would necessarily move from England to Holland or Spain or Russia, where profits might be higher."

Consider the following. For England "to produce cloth may require the labour of 100 men for one year, and if she attempted to make wine, it might require the labour of 120 men for the same time". And of Portugal, "to produce wine in Portugal might only require the labour of 80 men for one year, and to produce cloth in the same country might require the labour of 90 men for the same time". Obviously Portugal enjoys absolute advantage in the production of both goods, yet its own interests are best served by producing wine and exporting its surplus, while England should produce cloth only. Why this is so, and thus an explanation of the theory of comparative advantage is given as follows.

Consider the opportunity cost involved in the production of wine (cloth) in terms of the foregone production of the other good, cloth (wine).

Opportunity costs for	**Wine**	**Cloth**
Portugal	80/90 =8/9	90/80=9/8
England	120/100=6/5	100/120=5/6

A country has a comparative advantage in producing a good if the opportunity cost of producing the good is lower at home than in the other country. Thus Portugal has a comparative advantage in the production of wine and England has a comparative advantage in the production of cloth. As long as the two countries' opportunity costs for one good differ then comparative advantage will lie in the production of one or other good, in one or other country.

Where opportunity costs are equal for both goods in both countries, then trade will not occur.

To reiterate this, consider Ricardo's reappraisal of Smith's example of the shoemaker and the tailor. Ricardo says "two men can both make shoes and hats, and one is superior to the other in both employments, but in making hats, he can only exceed his competitor by 1/5 or 20%, and in making shoes he can excel him by 1/3 or 33%. Will it not be for the interest of both, that the superior man should employ himself exclusively in making shoes, and the inferior man in making hats".

Returning to the example of wine and cloth, suppose that 1 unit of wine trades for 1 unit of cloth. In England whereby previously 1 unit of wine traded for 1 unit of cloth, now England can obtain its requirements of wine from Portugal but at a cost to England of 100 man hours per unit. Thus there is a saving of 20 man hours times the quantity of wine consumed previously. This saving can then be utilised in the production of greater quantities of cloth than had previously occurred, which can either be consumed or exchanged for more wine. Thus the value of trade equals quantity traded times traded price as calculated according to the exchange rate between gold as valued in England and Portugal. In the case of an individual incident of trade whereby "if by the purchase of English goods to the amount of 1000L a merchant can obtain a quantity of foreign goods, which he can sell in the English market for 1200L he will obtain 20% profit by such an employment of his capital." This 200L marks the increase in "the amount of value in the country" due to profits. But also "as a consequence of the price of foreign commodities being cheaper, a lesser portion of the annual produce of the land and labour of England is employed in the purchase of foreign commodities". This reduction of price by importation Ricardo views as equivalent to increased productivity through changing technology. "If by the introduction of cheap foreign goods I can save 20% from my expenditure, the effect will be precisely the same as if machinery had lowered the expense of their production, but profits would not be raised". Thus trade is of similar effect on domestic prices as if technology had reduced costs and so prices.

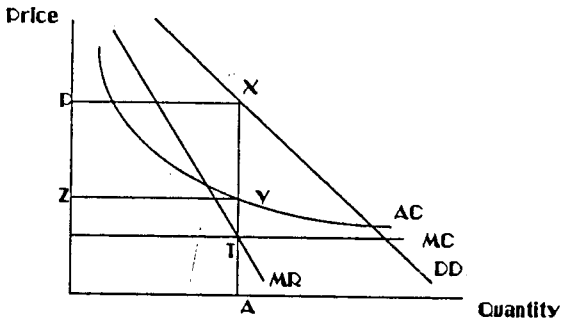
A more modern analytic framework would show that trade permits an economy to move to a new position on the production possibility frontier because of a change in the relative prices of wine and cloth. This new price ratio allows the economy to enjoy a higher level of general utility, on a higher indifference curve. This is essentially what Ricardo is alluding to. Note he states that trade releases labour and capital for the production of greater quantities of output than had previously been obtained, and that reduced prices will ensure that labour will consume that produce, thereby increasing the utility of society.

Ricardo says of impediments to trade that "bounties on exportation or importation, new taxes on commodities sometimes by their direct, and at other times by their indirect operation, disturb the natural trade of barter". Trade being determined by comparative advantage is as much a natural law as its utilitarian outcome; interfering in traded prices directly or introducing non-tariff trade barriers removes the profit of the merchant. By restricting his activities in one commercial market all others are disturbed to society's detriment. If Portugal was unable to trade its wine with England due to interference in free trade then "the diminution of money in one country and its increase in another (Portuguese export earnings fall, English import bill falls also) does not operate on the price of one commodity only, but on the prices of all, and therefore the price of both wine and cloth will be raised in England".

Ricardo's arguments are compelling, but revealed in Paulo Cecchini's detailed report concerning the gains from European integration and the benefits of a single market are succinctly different explanations of the causes of a large proportion of European trade, and how 1992 will release greater forces for trade. It would be wrong however to forget the enormous debt of gratitude owed Ricardo for laying the foundations of all subsequent theories of trade, theories from which

the report derives much of its content. The report talks of gains from trade which are foreign to Ricardo's writings. Firstly, a form of trading which Ricardo did not consider was intra-industry trading. Ricardo gives no account of both Portugal and England trading both cloth and wine. Portugal either exports wine or imports it, but never both. But evident in the NESC report, *Ireland in the European Community*, are figures that give ranges of Intra-Industry Trade Indices from 0.28 to 0.68 of total trade in sections of the economy so the effects of 1992 upon intra-industry trade requires investigation. Secondly, Ricardo assumed that there exists perfectly competitive domestic markets. Obviously this is not a reality, so we need to explore the consequences of market integration upon imperfectly competitive markets, especially monopoly markets. Thirdly, beyond the initial "cold shower" effect the report lists dynamic effects, economies of scale, and the learning curve, again foreign to Ricardo and of significance in estimating the benefits of 1992. As a sub-theme of this I will postulate the effect upon industrial structure and movements of labour of economies of scale and the concentration of labour in the wake of 1992 for Ireland.

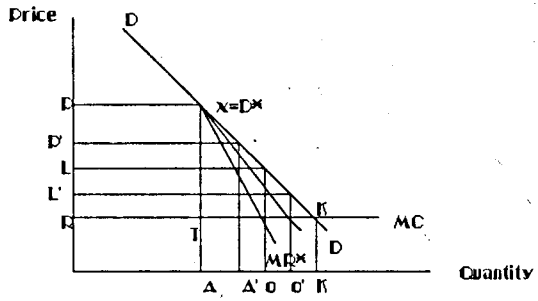
We can compose a model that explains how intra-industry trade arises, and from a position whereby previously the two oligopolistic firms were domestic monopolies. Assume that both firms produce the same good and that costs are sufficiently high to prevent the entry of a new firm. To keep the contrast with Ricardo, let the good be cloth and the firms be England plc and Portugal plc. Treating England's position as analogous to Portugal's so the following simple diagram is indicative of the pre-trade situation of both firms. The profit maximising output for England is that level of output at which MC intersects MR. Point T corresponds to OA output at price P. The price being found by tracing the plane through AT up to the Demand Curve DD, then across to P. Revenue equals OAXP and total costs OAYZ. (TC=AC.Q, AC derived from tracing the vertical plane through AT until it intersects the AC curve. The price OZ is in fact cost per unit of output if output is OA) TR - TC = P profits, which are ZYXP.



By their existing excessive prices and the siphoning off of supernormal profits, consumer surplus is reduced and society suffers a deadweight loss of welfare. So how does trade recoup some of these losses in both England plc's and Portugal plc's domestic markets?

The opening of trade creates a scenario of oligopolistic competition. It is strategically different to the monopoly model and Ricardo's early form of perfect competition, because as Kenen states "with oligopoly .... each firm is large enough to influence others and must forecast behaviour when making any move of its own". Our strategic assumption will be that each firm believes the other will maintain domestic output. A share of the foreign market will be attained only by setting a lower price than already exists. So already downward pressure can be seen operating on prices (on both domestic markets). We have worked from an assumption of identical cost and demand conditions, and factor endowments.

Trade occurring in such conditions goes against what I have attributed to Ricardo. Consider diagram 2, the English domestic market. Faced with effective demand D*D and thus MR*, Portugal plc sets price at OL, its output being OA, according to the P-maximising constraint MC = MR. Knowing that T is equidistant from R and K, so V is equidistant from T and K (how this is so is not essential to the purposes of this essay). England responds by reducing its price OP', its output being OA', and duly Portugal responds in turn subject to MR".



The pattern by which output expands is that for expansion of English output, Portuguese shipments increase by one half that amount. oo'=1/2AA'.

We can trace the relationship of England's and Portugal's changes in output through what are called reaction curves. These produce the final equilibrium output for England and Portugal in each respective domestic market. Overall there emerges a peculiar picture. Despite prices, costs and factor endowments being equal, intra-industry trade occurs, the result of which is that prices and profits fall due to strategic competitive forces. The welfare gains are increased output for consumption at lower prices, and with less deadweight loss. While oligopoly is still not a fully competitive situation our analysis demonstrates that movements to situations of greater competition bring gains.

And what is the relevance of this to the specific measures outlined in the Cecchini report? The report outlines various instances of non-tariff barriers to trade that will be removed: the abolition of customs formalities and related delays; the harmonisation of divergent national standards and regulations; the removal of domestic monopolies enjoyed in public procurement; the liberalisation of the financial markets. Some of these directly remove monopoly and oligopolistic practices in areas such as public procurement and the financial markets and so release beneficial competitive forces. Others tackle implicit trade restrictions that work through a mechanism of increasing transit costs etc. and thus allow price differentials beyond what 'natural barriers' might explain. The report states that competition is the key to reducing costs and prices of existing outputs. "Studies carried out in Britain and France show just how substantial are the losses in efficiency linked to monopoly power in certain industries. There is moreover an irresistable correlation (more than 80%) between the sectors for whose products there are large price differences between EC countries and those where industrial power is concentrated". The implications for firms is that profits will be increasingly responsive to the firm's competitive position. Profit margins will be squeezed but the effect of falling internal costs, and falling input and other external costs will keep profits bouyant despite the downward tendency in prices. However, in the medium- to long-term it is the firm's ability to seize the dynamic gains available which is crucial.

These dynamic gains of market integration and enlarged traded markets include economies of scale and the learning curve effect, as well as the orthodox dynamic effects of innovation and technical progress. Economies of scale are

included because in the context of 1992, they will occur after the initial 'cold shower' effect on supply side conditions. Dynamics captures the essence of the bullish approach companies will require to expand output and so reduce costs through 'learning' (experience), and economies of scale through business rationalisation and the elimination of sub-optimal production. The report states that "comparative advantage is no longer seen as a divine inheritance" in marked contrast to Ricardo's view one hundred and seventy years earlier.

Krugman (1979) provides a simple model of internal scale economies. The effect of trade (intra-industry trade) upon a previously closed market facing constant marginal costs (so declining average costs) was to create "an increase in both the scale of production and the range of goods available for consumption". In Krugman's model the direction of trade is indeterminate, but by an extrapolation from our model of oligopolistic competition, we know costs to be the determining force behind trade flows. Again the distinction from Ricardo exists. The model states as an assumption that tastes, technology and factor endowments are all homogeneous being nations, yet through economies of scale trade occurs. The structure of competition is one of Chamberlinian monopolistic competition. Obviously 1992 will result in many varied forms of market structure, and with degrees of competition greater than monopolistic competition, but there do exist fears amongst certain EC members that scale economies may lead to a concentration of industry and the most mobile sections of the labour force, to the detriment of peripheral economies such as Ireland. We can use Krugman's model to explore this.

As an extension of the model, Krugman allowed for movement of labour between countries. As in the Heckscher-Ohlin Theory of world trade, trade and factor movements can be viewed as substitutes, factor movements being induced by impediments to trade. In its extreme form, a complete blockage of trade would result in mass emigration to the region with the greater real wage, variety of goods etc., but in a more realistic form Krugman suggests "suppose that the population of each region is divided into a mobile group and an immobile one. Migration would then move all the mobile people into one region, leaving behind an immiserised Appalachia of immobile people whose standard of living is depressed by the smallness of the market". There are those who suggest that Ireland will eventually become the "Appalachia" of Europe due to our position on the periphery of European industry, and the existing high levels of emigration. But if anything, I contend that1992 and all that goes with it will present Ireland with an opportunity to stem the flow of emigration, and Krugman's findings suggest this is possible.

The benefits ushered in by European market integration will manifest themselves directly as consumer benefits, reduced prices, greater output for consumption and a greater range of products due to product differentiation and innovation. Ricardo was aware of this, although not of their existence outside the confines of international trade. However unique to the Cecchini report is the increased Pan-European attitude to technology and product innovation that 1992 will enact through market forces, the more practical harmonisation of standards and a new psychological attitude to European co-operation. Ricardo viewed trade in a nationalistic manner, but to be fair to Ricardo he was less European in outlook. 1992 will provide valid economic motivations for technological co-operation but I strongly believe, it represents a watershed, a psychological barrier beyond which our commitment to trade is not simply based on its utilitarian benefits but our mutual interdependence in Europe. Yet in its essence it is a return to the spirit of Ricardo.

Mark Whelan

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The Rational Expectations Hypothesis: An Appropriate Concept?

INTRODUCTION

From the outset, it must be explicitly acknowledged that the rational expections hypothesis (REH), as espoused by the new classical school, is not merely a justification for the restoration of pre-Keynesian economic principles. Rather, it is an attempt to tackle the nature of uncertainty: this has, for far too long, been ignored. Uncertainty permeates the economic world: there is no excuse for constantly assuming it out of existence. However, I shall argue that the REH is an incorrect method of coping with uncertainty. This shall be attempted in three distinct sections.The first deals with why the REH is inconsistent in its approach to stochastic dynamics. Secondly, the specific nature of information in rational expections models will be discussed critically and finally, a brief application of these arguments to macro-economics shall be presented, contending that the REH is inappropriate. The contribution of rational expectations to econometrics is not dealt with in this paper.

THE REH AND UNCERTAINTY

The hypothesis in question is not merely the assertion of rationality of economic agents: it refers to a specific concept, developed from Muth (1961).[1] Loosely, it says that agents forecast a future value of some variable such that it corresponds to the actual process by which the variable is determined, with the efficient use of all relevant information. More formally, the subjective probability distribution of a future economic variable at time t coincides with the actual objective conditional distribution, based on all information at time t.[2] The implication is that the conditional expection is unbiased and the forecast errors are orthogonal i.e. they are independent of any variable that was known to the agent at the time of the forecast. So systematic errors cannot occur given the nature of the agent assumed, all errors are purely random.

To comprehend the significance of this theory, it must be remembered that the REH is, in essence, a reaction against classical comparative static partial equilibrium analysis. Sargent[3], in particular, has emphasized this theme. Stationary state economics, a legacy from the last century, assumed full knowledge and ignored uncertainty extremely inappropriate in a science of human behaviour. The old argument that all assumptions are definitionally unreal does not, in this context, capture the importance of the issue. Uncertainty must alter one's perception of indvidual actions. Therefore, Sargent argues, the REH introduces stochastic dynamics to economics, so providing an element of internal consistency to the neoclassical research programme.[4]

This defence of the REH is paradoxical however, precisely because of its inherent general equilibrium nature. The world of Arrow-Debreu is merely a mathematical abstraction. This, in itself, is not challenged- however, the acceptance of perfect foresight in all markets, for all future dates, is an expression in instrumentalism I am unwilling to accept. Tobin (1980)[5] has argued convincingly that, even though the REH accepts uncertainty and randomness, acknowledging that the assumption of market clearing in the style of Arrow-Debreu is implausible, the fact that agents expect what actually happens means the theory is firmly rooted in classical steady-state analysis.The REH is really traditional statics generalised to a suitably stochastic environment. As Brunner[6] highlights, little is accomplished by claiming to introduce uncertainty, while simultaneously assuming full information about the stochastic process.

The REH ignores Bayesian theory, the most appropriate viewpoint when dealing with the behaviour of individuals. In this light, probability is interpreted

in terms of a persons subjective "degree of confidence" in the future event. There exists, therefore no valid reason why different agents, given similar information, should arrive at the same estimate of the random variable in question. Thinking in terms of expected future values is quite misguided. Indeed, according to Tobin, the natural consideration under uncertainty is the variance of the distribution: the REH concentrates exclusively on the mean.

At a fundamental level, therefore, the nature of uncertainty must be considered. In economics,uncertainty does not only reflect states of nature, but also behavioural psychological human motivation which does not exist in isolation of the actions and motivations of other economic agents.[7] The only possible methodological salvation of the REH is, therefore, the assumption that all agents are perfectly aware of the reaction of others, which would merely be a reassertion of perfect knowledge.

It would be incorrect to view the REH as a new departure in economics. Anyway, the idea that the anticipated future can significantly influence the present is nothing new to Paul Sweezy's oligopoly theory, for example, is founded upon this notion. The Ricardian Equivalence Theorem, it is often held, dates from 1810! Normal income theories of aggregate consumption possess similar intertemporal foundations. One of the greatest insights into the psychological nature of economic man was displayed by Keynes' *A Treatise of Probability* (1921)[8]. He rejects the relative frequency approach, proclaiming it to be entirely alien to economics, while in the *General Theory* (1936)[9], this theme is developed, with an ingenious and novel approach to uncertainty in the asset market.

To conclude this section, then, uncertainty, which the REH pertains to model, implies the structure of the economy is inherently unstable, while the hypothesis assumes the opposite! This inconsistency follows the incessant drive to turn back the clock on the *General Theory* , causing some of Keynes's most remarkable insights to be lost. In particular, Lucas' models deal only with relative frequency concepts the difficulty created by attemting to model behavioural uncertainty does not justify assuming it out of existence

THE REH AND INFORMATION

As seen, the REH assumes the agent has full information on all exogenous variables, and on the structure of the economy. Abstracting now from the nature of uncertainty, this central assumption creates a further array of problems.

New classical theorists point the recurrent nature of events (business cycles, for example) as an indication of the knowledge held by agents on the structure of the economy. Nobody denies that many economic phenomena are indeed predictable. The REH, however provides no indication of how this knowledge is actually obtained, such that forecast errors are random i.e. no learning is considered. The actual dynamic process is ignored. Benjamin Friedman (1979)[10] has produced a model of rational expectations inclusive of a finite learning period (specifically a least squares regression with all information except that of the latest period) concluding that, in the short run at least, error orthogonality is likely to be violated. The learning period cannot be seen as instantaneous. Once again, the assumption of perfect knowledge or, more precisely, knowledge of the specification of all relationships in the structure of the economy is required to justify error orthogonality.

The recognition of the existence of a finite learning period, within which any assumptions about information do not necesarily hold, creates new complications to further disturb the new classical description. One byproduct of uncertainty in Government policy is the possibility of credibility problems, the classic example being the doubt nurtured in many, concerning the Conservative Govenment's ability to maintain it's anti-inflationary policies in the early 1980s, against the tide of rising unemployment. Lucas, of course, would hold that this is perfectly consistent with his rational expectations models, since "surprises" do occur, especially in unpredictable circumstances. Yet policy effects can never

fully be anticipated. The private sector cannot be held in suspended animation while the economic agent calculates the effects of some Government action. The Keynesian investment theory suggests that the degree of optimism prevailing is a vital consideration: it is arguable that the 1950s and the 1960s were inherently stable because of a considerable amount of optimism: this is untrue, though, of the post-1970s period.

Basically, the assumptions concerning information are grossly oversimplified. The crucial point that must be emphasized is not that it is unreasonable to assume that the Government is privy to precisely the same quantity of information as any other agent, nor that agents are required to be, in the terminology of Arrow, "superior statisticians" (this concept pervades the entire neoclassical paradigm- consider the theory of demand), but rather that the information is assumed homogeneous, thus preventing the possibility of behavioural uncertainty.[11] Without this assumption the notion of a "representative" agent, a vital one for the REH, loses meaning.

In summary, there is a huge conceptual leap between neoclassical utility maximisation and the REH, based, as it is, on unreal assumptions concerning the nature of information.

THE REH AND MACROECONOMIC POLICY

In this section, I shall use these theoretical arguments to elucidate various aspects of the macro-economy which invalidate the REH. It is often argued that rational expectations are nothing more than an analytical device constructed to cast a cloud over the heart of the proposition the acceptance of flexible prices and market clearing. In policy terms, the impotence of Government stabilization is emphasized, given the (strong) assumptions of the REH. Yet a cursory glance over the new classical analysis illuminates the distinction between rational expectations as a model-building device and market-clearing as a classical belief. It is submitted that the very core of the REH, the assumptions concerning information, are diluted to such a degree that the hypothesis becomes almost devoid of substance.

I shall briefly highlight some insights into macroeconomic phenomena offered by the REH. Modigliani[12] declares "..... the most glaring flaw of ..... [the REH] ..... is it's inconsistency with the evidence: if it were valid, deviations of unemployment from the natural rate would be small and transitory- in which case the *General Theory* would not have been written ..... ". Short run adjustment is an illusion: the REH fails to explain why deviations are drawn out. Lucas and Sargent (1978)[13] attempted this by the use of "propagation mechanisms"; the commonest being that which Lucas (1975)[14] argues that information is lagged, so that firms may confuse absolute with relative price changes. By the time the "mistake" is realised, the firm in question will be operating at an inappropriate level, with adjustment taking time. Similarly, Sargent (1979)[15] develops the notion of adjustment costs of investment to account for the slow reaction of firms.

Models of disequilibrium trading and institutional rigidities in the labour and goods markets are vehemently criticised by the new classical theorists for never specifying in whose interest these prices are set. Yet the aforementioned assumption of asymmetric information is just as arbitrary as any. The logic of this assumption must be stretched a great deal to account for periods in time such as the Great Depression in the 1930s. Can this seriously be written off as a response to "surprises", lagged information or slow adjustment on the part of firms, and voluntary unemployment on the part of workers? As Okun (1981)[16] remarks, an overemphasis on search theory ignores the fact that, in slumps, unemployment rises by layoffs rather than quits. Indeed, on this latter point, one feature which Lucas finds difficult explaining is the rise in the natural rate over time. Modigliani argues that this approach to the labour market implies the Depression was caused by an outbreak of "contagious laziness"!

It is not the purpose of this paper to analyse whether the Depression is viewed more appropriately in the traditional Keynesian disequilibrium context, or via the revisionist Friedman-Schwarz monetary approach. I do contend , however, that the REH clearly cannot provide an adequate explanation of this phenomenon. Nor is it my intention to discuss the whole nature of information and uncertainty applied to macro-models, except to argue that there is no reason to necessitate it being dealt with exclusively by equilibrium models. Asymmetric or incomplete information can just as easily be used in a disequilibrium context. Uncertainty is rife: nobody can be entirely sure if the relevant demand and supply shocks are temporary or permanent. Milton Friedman, for example was quite confident that OPEC would collapse and oil prices fall by 1976!

Ad hoc assumptions, used to defend the REH from the very problems I have discussed, tend to weaken the hypothesis significantly leaving what Townsend[17] calls language barriers between the new classical school and it's opponents, overshadowing a basic equilibrium/disequilibrium dichotomy.

In summary, I have argued that the conclusions of the new classical school concerning the duration of deviations from the natural rate and, especially, unemployment, are not appropriate when dealing with the macro-economy. Furthermore, in response to these inadequacies, the actual REH, it is contended, when modified in the aforementioned manner is no longer significant.

CONCLUSION

This paper has argued strongly that the REH is not an appropriate concept. It began with an abstract consideration of how the concept of uncertainty used in this hypothesis is misguided. From this, I examined the specific problems concerning the strong assumptions on information. The final section offered a somewhat brief taste of the macroeconomic issues involved, arguing that the REH is flawed; the unreal assumptions making it inapplicable in general. (It is advantageous when considering some specific markets, namely speculative ones.) The attempts by these theorists to adapt their models to suit the "real world" has caused the REH to disguise their true arguments, which are, needless to say, beyond the scope of this paper.

So, even though the discipline has no competent expectations theory, it would be unwise to accept the REH on these grounds given the myriad of problematic issues it raises.

Tony Annett

FOOTNOTES

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Modern Political Economics: An Overview

INTRODUCTION

In this paper it is argued that the disciplines of politics and economics have been linked in three main ways. First of all, the founders of political economy such as Smith, Mill, and Marx set economic prescriptions and descriptions within the context of a wider social vision, usually in a literary or polemical way. Secondly, the theoretical apparatus of welfare economics has been constructed to demarcate positive economics from normative questions. It is argued that "political economics" or "contemporary political economy" attempts to approach the comprehensive vision of the first school and to emulate the awareness of the positive/normative distinction of the second. Furthermore, there is a modern and pragmatic emphasis on estimated econometric models for policy analysis, advice and forecasting. It would of course be misleading to construe the interaction between these sets of ideas as being a seamless, almost programmed evolution. Nevertheless, the many levels on which complementary and conflicting issues and approaches arise within and between them may provide an adequate basis for judging the value of the main idea to be considered in this paper, i.e. political economics.[1]

This then may be considered the context of political economics - how it "fits in" - but how does it "jut out" ? In other words, how is it distinct from other areas of social science, does it have a rationale of its own ? This question is treated below in the terms of the growth in importance of government in modern economies and the consequent apparent need to model government as an endogenous entity when making forecasts.

These considerations have led to a number of different approaches from an essentially abstract theory of economic policy to simple and intuitively attractive empirical analyses to very complex politico-economic models which attempt to capture the interactions between many government institutions and classes of economic agents within a modern economy. Some of the major variants on these themes are sketched below.

POLITICAL ECONOMY AS A BROAD ENDEAVOUR.

The notion of a comprehensive social vision is rooted in a time when intellectual leaders were expected to be generalists and because of the state of social inquiry, could justifiably claim to be just that. Ironically, it was Adam Smith, the man who impressed on economic thought the progressive nature of specialisation, who also exemplified this spirit of broad endeavour.

If Smith's reputation now rests with the "Wealth of Nations" (1776), it was first made with "The Theory of Moral Sentiments" (1759). Furthermore, he intended to complete his scheme with an ambitious review of forms of government throughout history. In this way he would have posited a closed theory of society, embracing a philosophical/ethical consideration of man in the social state, an account of the organisation of economic relations and a guide to the principles of good government. It is this huge synthetic exercise, rather than any one piece of economic analysis which some would see as guaranteeing Smith's place as a great, perhaps the first, social scientist.[2]

In much the same way the mind of John Stuart Mill could encompass philosophy (both moral and political) and economics and attempt to weld them into a coherent intellectual entity, which has a major influence on liberal democracies to this day. The relevant works in this case are "On Liberty" (1859), "Principles of Political Economy" (1848), and "Considerations on Representative Government" (1861) .

These two thinkers are often pitted against Marx in terms of economic substance and political prescription. Certainly Marx used Smith to understand what Capitalism said about itself, in order to attack it. But in one

methodological principle there is a simple co-incidence between the positions of these three writers (and of others); the desire to construct comprehensive analytic systems, anchored in philosophical principles and relevant to contemporary political realities. Marx is renowned for such an inclusive vision - one that came to be seen by some adherents not as just "a good idea" but as "historically and scientifically true".[3] Schumpeter, in considering the case for a broad understanding of society, summed up admirably and wryly:

"In particular, an economics that includes an adequate analysis of government action and of the mechanisms and prevailing philosophies of political life is likely to be much more satisfactory to the beginner than an array of different sciences which he does not known how to co-ordinate -whereas to his delight, he finds precisely what he seeks ready- made in Karl Marx." [4]

The contributions of many individual economists of our own times owe a lot to the influences of the capitalist Smith, the liberal Mill and/or Marx. In the same way that a natural scientist hoping to advance a programme of research must start by accepting a set of fundamental principles already established, economists explicitly and implicitly build on the accumulated work of others. This may take the form of pragmatically accepting empirical results, analytic devices, or most importantly in this context value judgements.

Some however reject as sterile the resulting mass of specialised results and wish to start again with a social vision - or in Kuhn's terminology, shift the paradigm. Although in very recent times none has achieved the status of the three mentioned above, a few have been credited with (or accused of) making the attempt. One such is Galbraith.

In a typical passage, this maverick laments and ridicules specialisation; on expecting at the University of California to meet experts on agricultural economics or even fruit prices, he discovers economists who domain is restricted to prune prices. He comments thus :

"They would have been less useful if exposed to more cosmic questions or even diversified to artichokes."

Galbraith makes his real point later in the same piece :

"....at least in the social sciences, specialisation is also a source of error....The world to its discredit does not divide neatly along the lines that separate the specialists."[5]

Galbraith's theory extends over psychology, political communication, macroeconomics and industrial organisation. He is grouped by Bruno Frey with a number of others such as Veblen, Myrdal and Kaldor as representing the "Unorthodox" tradition. Significantly for these purposes, one of the elements which Frey sees as uniting these individuals is that they see the economy as part of a socio-cultural system and so as understandable only in a trans-disciplinary way.[6]

The preceding has attempted to link an admittedly diverse group. That link is simple, but not trivial - the debate between these traditions has occupied human minds and motivated human actions to an enormous extent. As against this, this debate can become entirely unstructured, and often is dominated by ideology run riot at worst and essentially normative disputes at best. Modern welfare economics is sometimes seen as rescuing political economy from endless normative conflict and the next section outlines some of the issues raised thereby.

ECONOMICS AND VIEWS OF SOCIETAL WELFARE.

It could be said that welfare economics has contributed in two ways to this discussion; its concern with the efficacy of the competitive market in achieving social goals and its concern with the normative/positive divide. These two related issues are broadly reflected in the three fundamental theorems of welfare economics. The net result, it is argued, is a set of analytical concepts to guide

the political economist, and which although unable to claim to solve philosophical and practical problems of economic welfare (and thus political economics), does provide a coherent framework in which to approach them.

The first two fundamental theorems of welfare economics establish the Pareto optimality of competitive equilibrium and the possibility of moving to any desired equilibrium by appropriate lump-sum transfer payments. This essentially abstract construct has provided the framework for a debate which is central to political economy: the role and extent of government intervention in the economy. State action is seen as correcting for market failure i.e. the breakdown of the model's assumptions and so can be advocated on an apparently pragmatic case-by-case basis.[7]

However, since questions of distribution arise, the scheme is substantially complicated. A number of compensation criteria/measures of welfare changes have been advanced and critically examined (e.g. Marshallian consumers' surplus, Hicks and Kaldor criteria). The necessity of a social decision still remains and in this context the tradition from Condorcet to Arrow becomes relevant. Thus the third theorem shows that under certain weak assumptions, there is no logically infallible way of aggregating the preferences of diverse individuals. Sketched this way, welfare economics may seem to the political economist as no more than a litany of negative results. Feldman expresses this feeling as follows:

"We feel we know, as Adam Smith knew, which policies would increase the wealth of nations. But because of all our theoretic goblins, we can no longer prove it."[8]

Nevertheless, political economics will probably continue to refer and defer to this body of work, for a number of reasons. As to the previous point, proven negative results act as brakes on over-ambitious system-builders. Thus for example, the modern literature of political economics often specifies objective functions, which are social welfare functions in disguise, and so make implicit assumptions about individual preferences which may or may not be justified. Welfare economics provides secure micro-foundations for societal analysis which are more coherent than the highly aggregated concepts used in most variants of macroeconomics. Also, results and insights from public choice theory can be incorporated into politico-economic models (e.g. optimal tax policy, public good provision) to provide a benchmark form which to evaluate the actual behaviour of government institutions. Above all, welfare economics is, as Little says, a "calculus with an ethical interpretation ".[9] The problem of separating value judgements from scientific statements, recognised by Hume's Law , which has ensured welfare economics is both mathematical and philosophical also informs political economics.

It could be argued that as soon as a researcher chooses any area on which to focus, a value judgement is made (i.e. about what is a priori important). However, even accepting this rather austere caveat, political economics could advance two methodological claims, the first of which it owes to welfare economics. This concerns the way in which political economists make explicit their value judgements about the relative importance of social agents, as opposed to the implicit assumptions of economic theory.[10] The second (and related) claim is that political economics is in large measure devoted to actually discovering the operative value judgements of politico-economic participants. This stands in contrast to the dominant economic view of benevolent ministers and altruistic civil servants working in harmony for the well-defined common good of a homogeneous nation of Paretian liberals and "efficient happiness machines". [11]

Welfare economics has thus been presented in this paper as the second major element in the context of modern political economics. Its distinctive rationale provides the theme for the next section.

THE RATIONALE FOR MODERN POLITICAL ECONOMICS.

Modern political economics is predicated on the important (and often growing) role now accorded to government in the economy, even in avowedly market-driven societies. As a consequence, so it is argued, there is a need to explicitly model the behaviour of the public sector and its interaction with the structure of the economy.

In the period 1965-1984 the OECD (unweighted) average of general government expenditure rose form 29% to 50% of GDP, with this indicator varying from in 1984 from 33% in Japan to 64% in Sweden. The OECD comments that such figures imply that general government expenditures had grown on average 2.9% per year faster than the value of economic output over the period in question. This aggregate measure comprises the following five main categories of expenditure:

- Public goods e.g. defence and general government administration.
- Merit goods e.g. education, health, housing and community services.
- Income maintenance e.g. pensions, family allowances, unemployment compensation.
- Economic services e.g. capital transactions and subsidies.
- Interest on the public debt. [12]

The agenda of public involvement is obviously extended by considering the other side of fiscal policy (i.e. taxation policy), the operation of monetary policy and the interrelationships between these two (e.g. interest rate consequences of fiscal deficits). Qualitatively, government also can have substantial regulatory powers, in domestic markets otherwise free of intervention, and with respect to regulating international trading relationships. [13]

Again such a broadly-sketched background, van Winden's quote from Morgenstern is relevant:

" Economic theory assumes the allocation of resources is only through markets...This view completely overlooks the existence of governments, national and local, where allocations are made not through the medium of the markets but by voting... Congress, parliaments, governments vote how much is to be invested in capital goods, when and where the investment takes place. They vote the income of millions of persons... Clearly the movement of these funds - a respectable percentage of national income - sets forth flows of money, determines demand and thus affects the "free economic sector" of the whole economy with its prices, incomes and allocations. " [14]

Although the idea that political action influences real economic outcomes may seem an unexceptional statement, it is vigorously challenged in one sense by the New Classical School. Borooah and van der Ploeg treat this question in detail, characterising the critics' position as based on complete faith in the market mechanism allied to the concepts of natural rates of real economic variables and rational expectations and asserting "that it is impossible for any policy to systematically alter the outcome of real variables". Borooah and van der Ploeg argue that this policy neutrality position breaks down when for example, market participants do not have complete information, when models are non-linear or when economic policy affects the natural rates. A complete exposition of this debate is beyond the scope of this paper, but one further point may be relevant . To posit rational expectations may be to confuse an a priori assumption with an empirical question. Indeed, many studies in political economics impinge directly on this issue, in attempting to discover, for example, voters' implicit rate of discount for past economic outcomes and other forms of expectations about the future. [15]

Frey and Schneider outline three main aims of politico-economic models. First of all, to achieve better specification of the government sector in macroeconomic models by endogenizing it. Secondly, to produce better overall forecasts by being able to predict government policy reactions. The third aim is then to improve the quality of policy advice from economists through an

awareness of political constraints within a closed system.[16]

The second aim above has immediate relevance to any economic agent whose own outcomes, decisions and expectations are contingent on public policy decisions. Economic forecasters typically make conventional assumptions about these matters, such as the assumption of the continuation of present policies. [17] The example of a recent ESRI macro-forecast to Ireland is illustrative in this regard; their policy assumptions implied Irish governments achieving current budget surpluses for a number of years. It is possible that a reliably estimated policy reaction function for the Irish government might add to this forecast's realism. It should be said that econometric politico-economic models generally make similar statistical assumptions to their purely economic counterparts, and so are open to similar qualifications in this respect.

FEATURES OF SOME GENERAL POLITICO-ECONOMIC MODELS.

(a) Frey and Schneider:

The research programme of the Zurich school, as outlined by Frey and Schneider, has provided an influential framework for general politico-economic models. [18] The starting point is a formal optimisation problem in which the government is seen as maximising its utility, subject to two constraints. First of all, its vote or popularity rating must exceed a certain value at election time, to ensure its re-election. This popularity rating in turn depends on economic performance variables which are related via a conventional economic model. Such an optimisation problem is often insoluble even analytically, so in the real world Frey and Schneider posit a satisficing strategy for government. The implication of this is that if a government has a popularity surplus (i.e. a rating greater than its re-election threshold) it will pursue its own ideological goals (in this context, often the interests of its own core constituency. A popularity deficit, on the other hand is seen as motivating government to pursue policies designed to increase its re- election chances.

(b) Hibbs:

Another important interpretation is given by Hibbs. The concept of constrained supply and demand of economic outcomes is central to this analysis. The estimable form of such models usually comprise three elements. A demand for economic outcomes function relates mass political support to macroeconomic performance variables and thus "implicitly reveals information about the public's relative economic priorities and preferences". This function can embrace dummy variables representing the influence of non-economic factors and its structure may be lagged or contain special terms to infer voters' rate of discount of past outcomes.

The second element is an essentially conventional economic model with an orientation towards relating outcomes to changes in quantitative policy instruments. Finally, a policy reaction function brings these objective and constraint relationships together, relating changes in policy variables to changes in outcomes and preferences, often specifying the satisficing behaviour outlined above. Particular interest in this area has been focused on the evidence for and against political business cycles, whereby politicians are thought to operate policy to artificially generate growth as elections approach. [19]

The preceding material has briefly sketched some features of politico-economic models. It remains to be seen whether work of this kind will become part of mainstream thought in the discipline. At the very least, it will have encouraged some elements of dogma to be challenged and explored.

Aidan Kane

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[1] Many terms have been used to describe political economics as understood here, including "contemporary political economy", "an economic theory of

politics" and even "polito-metrics". The precise meaning and scope of these labels vary from author to author.

[2] See Andrew Skinner's introduction to the 1974 Penguin edition of Smith's "Wealth of Nations", pp12-13.

[3] e.g. the Communist Party of the Soviet Union in pre- Gorbachev days.

[4] Schumpeter, Joeseph A. in "History of Economic Analysis" (1954), George Allen and Unwin, p22.

[5] Galbraith, J.K. "An Addendum on Economic Method and the Nature of Social Argument" in "The New Industrial State", 2nd Edition (1974) Pelican.

[6] Frey, Bruno S. "Modern Political Economy", (1978) Martin Robertson, pp53-65.

[7] e.g. John Andrew, Ch 2 "Primary Policy Objectives" in O'Hagan John W., "The Economy of Ireland" (1984) p38:

"In itself, the theory gives no indication of whether government policy should be highly interventionist or based principally on laissez-faire; that decision requires judgement on the empirical evidence of the different problems noted and the costs of intervention. In this sense - but perhaps in this sense only - the argument is politically neutral."

[8] Feldman, Allan M. - entry on Welfare Economics, "The New Palgrave", Macmillan (1987) p894.

[9] From Chapter XIV, Welfare Theory and Politics, in "A Critique of Welfare Economics" by I.M.D. Little, 2nd edition, Oxford (1957), p258.

[10] e.g. Sen, Amartya, entry on Social Choice, "The New Palgrave" p389;

"Social choice theory also provides a method of analysis, in which the insistence on the explicitness of axioms and the clarity of assumptions imposes exacting formulational demands....(this interpretation) is nevertheless broad enough to permit different types of axioms to be used and different political, economic and social beliefs to be incorporated into the axiom structure."

[11] For example Andrew John, in discussing primary policy objectives from a welfare economics perspective, presents policy -makers as seeking to maximize the welfare of society, although conscious of the limits to this "useful simplification" -in O'Hagan (ed) "The Economy of Ireland" 4th edition 1984.

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[16] Frey, Bruno S., and Schneider, Friedrich, "Recent Research on Empirical Politico-Economic Models" in Hibbs, Douglas A., and Fassbender, Heino, "Contemporary Political Economy", North- Holland (1981).

[17] The assumption of no policy-change is also conventionally used in annual public expenditure plans, to provide a benchmark from which to assess the real effects of actual policy changes proposed.

[18] Frey and Schneider op cit.

[19] Hibbs, Douglas A.,"The American Political Economy" Harvard (1987) and "The Political Economy of Industrial Democracies", Harvard (1987)

Social Time Preference and the Consumption-Growth Trade-off

INTRODUCTION

"What ever happened to saving?" (Economist, 1990). It is indeed a pertinent question. Over the past three decades, saving has fallen sharply in almost every rich country. Yet the answers offered to this question are often couched in vague terms such as "asset explosion" and "consumption boom".

This essay seeks to develop an analytical framework which can be used to explore in a more rigorous fashion the reasons behind the impact of such a savings slump. The point of departure is the general equilibrium assumption that markets exist for all goods in all time periods. This assumption is obviously unrealistic, at least in its purest sense. Yet every day, individuals and indeed societies make decisions about how their scarce resources should be allocated across different time periods. This discussion employs the mechanism of social time preference (STP) to examine how these decisions are made.

The analysis is divided into five sections. The first of these defines STP, and analyses its various components. Its relationship with the market rate of interest is briefly examined in section two. Section three derives a simple condition under which society will optimise its welfare over two periods. Section four amplifies this analysis to take account of all periods. Finally, section five looks briefly at the policy implications to which the analysis gives rise.

WHAT IS SOCIAL TIME PREFERENCE?

How does society decide between consuming now and consuming at some date in the future? Essintially, the sacrifice of consumption now is rational if the subsequent gains in future consumption excess, or are expected to exceed, the cost of the current sacrifice. Crucial to this rationale is the definition of gains in future consumption.

That part of income not consumes is invested, and hence it yields a growth in output. This implies that by postponing consumption to some future period, society will ultimately be able to consume more goods, and hence will enjoy a greater overall level of utility.(1) The logic of the above rationale would therefore indicate that the optimal course of action is the extreme of reducing current consumption to zero.

However, such a decision would be founded upon the aggregation of all consumption benefits, regardless of when they occur. This procedure ignores social time preference, which simply stated, involves the preference of society for present benefits over future benefits.

According to Dasgupta and Pearce, social time preference arises principally for two reasons (1978:137):

(i) Society simply does prefer the present to the future- there is pure myopia.

(ii) Future generations are likely to have higher levels of consumption. If the principal of diminishing marginal utility of consumption (DMUC) operates, then the marginal utility of current consumption exceeds that of future consumption. Future consumption should therefore be discounted.

The first of these, pure myopia, stems from the fact that there are two elements of risk involved in choosing to consume goods at a future date. Firstly, the goods themselves might not materialise. Secondly, the individual, being mortal, may not be around to receive the goods. In his analysis of this risk of death, Eckstein (1961) calculated rational individual time preference rates for the U.S. and his results show rates with a range of 0.04% (5 - 9 age group) to 7.45% (80 - 84 age group).

The second reason, which assumes that DMUC is an observable fact, can be

interpreted as an objective reason why people prefer the present to the future, or as a normative statement about why people should discount the future.

We can thus express the STPR more formally as follows:

$$STPR = s + I + d = r \quad (1)$$

where: s = the DMUC rate of discount
I = the pure myopia rate of discount
d = the risk-of-death rate of discount

The existence of STPR precludes the extreme situation posited above of zero consumption.

THE MARKET RATE OF INTEREST AS A PROXY TO THE STPR

At this point, it is instructive to examine the relation between the rate of interest and STP. If no alowance is made for risk, it can be argued that the market rate of interest will reflect on society's willingness to sacrifice current consumption for future consumption.

However, Haveman(1970) contends that there is little reason to suppose that market rates actually do reflect time preference rates. Firstly, individuals cannot borrow since the more that is extended on credit, the greater the risk of default. Secondly, individuals may not express all their preferences concerning the future in the market place. Thirdly, as Marglin (1963) notes, the preferences people manifest in an individual capacity may differ significantly those they express as a collective community.

Hence, it is implicit in the remainder of this discussion that unquestioning acceptance of the market rate of interest as an appropriate rate of discount is unjustified.

THE TWO-PERIOD CONSUMPTION DECISION

It was established in section one that society would, in the extreme, defer consumption indefinitely, were it not for the fact that people prefer current consumption to future consumption. The question that must now be asked is how do these opposing motives interact to determine the actual level of consumption and investment in the economy. This section seeks to answer this question using a simple two-period model.

Two-period analysis

Assume that all individuals have identical utility functions. Assume furthermore that the corresponding marginal utility function deriving from this function has constant elasticity, and is of the form

$$dU/dC = aC^{-e} \quad (2)$$

There is nothing sacred about this function, but it is a reasonable approximation to reality, and it is convenient for computation purposes.

On a theoretical level, it can then be shown that[1]

$$r = \frac{(1+k)^e(1+I+d)}{(1+n)^e} - 1 \quad (3)$$

where: r = STPR
k = rate of growth of total consumption
e = the constant elasticity of the marginal utility fuction
I = the pure myopia rate of discount
d = the risk of death rate of discount
n = the rate of growth of population

Now consider how society's consumption choice is made. The curve PP in Figure 1 (see over) represents a transformation function between two periods. It

shows the rate at which consumption in period t can be converted into consumption in period $t + 1$ via the medium of investment. Its slope is approximated by C_{t+1}/I, where $C_t=1$ is the level of consumption in period $t + 1$, and I_t is the level of investment in period t. Since the marginal net productivity of capital (MNP_k) in the economy is definitionally the amount by which Ct+1 exceeds I_t, this slope can be rewritten as $MNP_k + 1$.

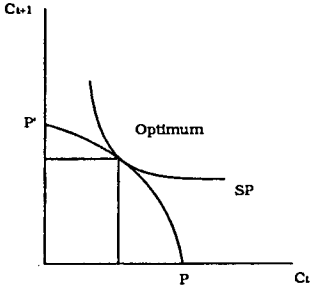

Figure 1

The curve SP is a social indifference curve, reflecting the various elements of society's time prefernces. Its slope will show the marginal rate of substitution between present and future consumption. However, this marginal rate if substitution will, by definition, equal societies rate of time preference. Hence the slope of SP is the STPR.

In order to optimise its welfare, society will endeavour to attain the highest indifference curve possible. It can easily be seen that this will be achieved when the slope of SP equals the slope of P'P. Hence, by using simple indifference analysis, the condition under which society's welfare is maximised can be identified. This condition is:

$$(1 + K)^e = \frac{(1 + MNPk)(1 + n)^e}{(1+ 1 + d)} \qquad (4)$$

In other words, if society's welfare over two periods is to be maximised, consumption in period two should be k times that in period one.

Qualifications to the two-period model

This model was used to good effect by both Feldstein (1964) and Hirschleifer (1970). However, there are a number of qualifications which must be noted. Firstly, the assumption of an omnipresent utility function with a constant elasticity derivative is strong, yet the expression for the STPR depends on it. Secondly, an apparent oddity of the approach is that the STPR is seen to depend on the rate of growth of consumption over the two periods, which in turn is itself dependent on the STPR: the direction of causality is unclear. However, it could be argued that the projects determined by the STPR are marginal, and therefore they do not have a significant effect on the overall rate of growth (Dasgupta and Pearce, 1978:144). Thirdly, investment in periods before t will have "throw-offs" in period t +1, and investment in period t will not all accrue in t + 1. These factors are ignored.

EXTENSION OVER ALL PERIODS

Given the above critisims, and the fact that the analysis so far has been restricted to two periods, it is clear that a more realistic intertemporal framework is needed if any worthwhile policy prescriptions are to be offered. This section seeks to develop such an alternative framework.

Multi-period analysis

Three essential assumptions underpin the following analysis:

(i) The welfare of the individuals in society can be aggregated using a simple social welfare function of the Bergson-Samuelson form. More formally:

$$SW_t = SW_t(U_1, U_2 \ldots\ldots, U_n)$$

where: SW_t denotes aggregate social welfare in period t.

(ii)Welfare in the society is growing at a continuous rate,q. This implies that, if SWo os aggregate social in period 0, aggrtgate social welfare in period t is given by SW_0e^{qt}.

(iii)Total social welfare in period t = 0 (TSWo) is the sum of individual welfares in that period, plus the sum of all future social welfares, discounted at the STPR.

If SW_t is given by the expression SW_0e^{qt}, then analogously, the rate of discount to be applied to this welfare will be ert. Hence the present value of SWt is given by:

$$\frac{SW_t}{e^{rt}} = \frac{SWoc^{qt}}{e^{rt}} = SWoe^{(q-r)t}$$

The sum of all these future social welfares can be obtained by integrating across all values of *t*. However, this course is an improper integral - it is intuitively obvious that, Armageddon excepted, the sum of all future welfares is infinite. Hence equation 7 can only be integrated across all values from 0 to an arbitrary but unspecified value of *t*.

Integrating:

$$TSW_t = \int_o^t SWoe^{(q-r)t} = SWo(e^{(q-r)t}-1)/(q-r)$$

(q - r) is itself the denominator of this expression, but it is an exponent in the numerator. Hence, it is clear by inspection that in order to maximise the expression, (q - r) must be maximised. This holds for all values of *t*.

Qualifications to the multi-period model

It is first important to note that, as in the case of the two-period model, r = r(q). This function can be incorporated in the integral above, and from this an optimal rate of consumption growth can be derived. However, the nature of the relationship between r and q is both dynamic and extremely difficult to establish.

Some contributors to the debate, notably Sen (1970) and Baumol (1965), have challenged the efficacy of the Bergson-Samuelson utility function, arguing that it neglects the interdependence of individual utility functions. Furthermore, the assumption that social welfare grows at a steady rate can also be questioned. Finally, the issue of uncertainty must be addresses, particularly if the analysis extends over a large number of periods.

AND POLICY?

Not withstanding these qualifications, the conclusion reached above does offer a policy prescriotion. To maximise welfare over all periods, (q - r) must be maximised. Hence attention should be directed towards both q and r.

Emphasis on the first of these has never been found to be lacking. Indeed, it could have been stated without reference to the analysis above that consumption growth is desirable. This is because it has a significant part to play in other aspects of the economy, such as the intratemporal allocation of resources. For example, growth is a necessary condition for a Pareto-efficient redistribution of wealth.

However, and this is the crucial point resulting from the analysis above, emphasis on consumption growth without reference to social time preference is misplaces. If more commodities are to be produced, the economy must grow. This in turn involves the postponement of consumption. Hence q falls in the short term. If too many resources are devoted to investment by government, people become impatient and myopic, asking why future generations should enjoy higher living standards at their expense, and r rises. Hence the overall effect is to reduce (q.-.r) and total welfare falls. From this perspective, policy-makers

endeavouring to maximise intertemporal welfare are wrong to concentrate exclusively on maximisation of growth.

An alternative danger reverses the direction of causality. If policy-makers artifically inflate the STPR, consumption growth will inevitably rise, yet only in the short run. A sustained high rate of consumption growth is incompatible with low investment. To illustrate, one has to look no further than the recent experience in Britain and the US. In both of these countries, policy-makers introduced ill-timed and overgenerous tax cuts. The STPR was artificially raised (people were induced to consume now rather than in the future), savings rates tumbles, and consumption boomed. The *Economist* article referred to in the introduction notes that, in America, public and private sectors together saved (net of depreciation) about 9% of national income in the 1960s, 8% in the 1970s and 3% in the 1980s. Ultimately, however, q must fall as there is no investment to sustain it at its high level. Once again (q - r) falls and future welfare is damaged. Indeed, Hale was recently prompted to write:

"[America] must develop a new policy mix for bolstering its rate of saving and investment, before public frustration with stagnant living-standards encourages even more destructive political flirtations with fiscal populism....." (1989: 42)

This essay has indicated that such a new policy mix would have to replace blinkered concentration on consumption growth with a more balanced perspective taking appropriate account of intertemporal resource allocation. One suggestion is tax reform. At present, taxes on personal and corporate income artificially inflate time preference rates, and discourage saving. Savings inventives, such as they do exist, are often distortionary in their impact. These policies should be reformulated to create conditions in which people and firms can make uninhibited, intelligent choices about how they can best allocate their resources over time.

CONCLUSION

Little and Mirrlees write that one must be able to quantify the relation between the rate of growth of consumption per head and the decline of the importance of further increases in such consumption (1974). This essay employed the mechanism of social time preference to offer one possible, albeit seminal, approach to this quantification. It must be remembered, however, that the issues involved are complex, and necessarily demand more complete attention than is possible in a single short essay.

It is not only policy-makers who can be accused of myopic concentration on single period analyses. Some eminent economists, notably Ramsey and Harrod (see Jones, 1975), have disputed whether future consumption should be discounted at all. This view is indefensible. As Solow writes: "many people save voluntarily to buy riskless assets paying 4 to 5 percent." Presumably, then, large classes of people have a marginal rate of time preferences of 4 to 5 per cent (96:1963). In sum, because consumption now and next year are competitive with each other, we have not one but two objectives. Policy-makers and economists alike must not lose sight of this.

Paul O'Connell

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The Greening of Economics

"We are confronted by a problem broad enough, and permanent enough, to draw us into the realm of science fiction. If pollution is permitted to worsen over the centuries and the cons, we can nevertheless suppose that life will somehow adapt itself. " Living systems are systems that reproduce," yes; but as the biologists define them, they are also systems "that mutate and reproduce their mutations." That is why living things "are endowed with a seemingly infinite capacity to adapt themselves to the exigencies of existence"-even in a cesspool."

-Solomon Fabricant in Boulding et al
"Economics of Pollution" p.149.

It has become commonplace to criticise economics for ignoring or indeed justifying environmental disruption. The preponderance of this viewpoint probably reached its peak in the 1970's with the publicaton of numerous apocalyptic style anti-growth theses (notably "Limits to Growth" and "A Blueprint for Survival") and when there were considerable misgivings and distrust of economic and econometric analysis due to its failure to predict the ensuing inflationary period . In a certain sense, economics has never regained respect. The basis for this distrust, however, is equivocal. To argue that economics "justifies" overexploitation and depletion of the earth's resources is tantamount to saying to saying that the study of ecology "justifies" an imbalance in nature simply because it is capable of explaining the source of that imbalance. In many senses, this essay could be seen as "a defence of economics". Certainly, economic growth (a goal advocated by many economists but importantly not by economics itself) can lead to environmental disruption, but economics has equipped itself with the necessary techniques to why this occurs and therein , how solutions or improvements can be found. It is these techniques and some of the related issues which shall primarily be discussed in this essay.

Welfare economics measures the impact of actions on economic welfare. The criterion for accepting an action as leading to an increase in economic welfare is that it should be Pareto optimal. It is argued that Pareto efficiency may best be achieved in the market system. The justification for this is similar to Adam Smith's concept of the Invisible Hand-that is to say, that individuals acting freely and in pursuit of their own self-interest will achieve a socially optimum and efficient result. A crucial feature, however, of pareto optimality is that it assumes that the only relationship between parties is that which arises from the price system. In reality, however, other types of dependency do exist and therefore a free-market situation will not always produce an efficient outcome. This can be seen in the prisoner's dilemma, which shows that where there is some form of interdependence , the rational pursuit of individual self-interest does not lead to a socially optimal result.

The relevant interdependency to an analysis of environmental pollution is where an externality exists. According to Nath, an externality occurs "wherever, due to the nature of the present economic and social institutions, costs are imposed on others which do not have to be paid for, or benefits are bestowed on others, for which nonpayment is received." The market does not reflect the true marginal values and costs, indicating economic inefficiency within the market system. where such externalities are negative (eg. pollution), the free-market output is greater than the social optimum; where positive (eg. education), the market output will be smaller than the optimum output.

As far as environmental disruption is concerned, the assessment of the related negative externalities is crucial in order to evaluate the benefits obtainable from the protection and improvement of the environment. Thus, social cost-benefit analysis has emerged as a means of pricing those resources which lie outside the market system. But to many the very essence of this

analysis is abhorrent. How can one put a price on clean air, water or indeed on human life? But yet we do make these sort of decisions everyday. Human life is not above valuation-the outright banning of smoking is vehemently opposed, despite known mortality risks, on the grounds of freedom and individual choice.

Of course, cost-benefit analysis is a complex task. It involves the evaluation and subsequent comparison of all the expected benefits and costs associated with a particular project or externality. Where the expected benefits exceed the costs, then action is deemed socially justifiable. But enormous problems of specification can emerge. For example, with regard to the current Dublin smog problem, it would be necessary to identify, measure and attribute all of the damage costs of the smog to their various sources. The complexity of such an analysis is obvious. There is also the ambiguous nature of cost-benefit evaluation which Kapp has highlighted. He argues, that for example, increased property values which may result from an improvement in the quality of air and water due to pollution control are just as unearned or external as the decreased values which may have arisen due to the original existence of pollution. Is welfare economics and cost-benefit analysis, therefore, only really concerned with a kind of one-sided efficiency?

Another approach which is becoming popular is to see externalities as arising from the failure to define and enforce property rights in certain areas of economic activity. People see certain goods or resources as being free. They therefore have a right to (a) pollute the air or (b) have clean air. Traditional analysis of externalities has tended to certain on two-party situations. Person A pollutes a river running through Person B's land. Both A and B are equal in economic power and have full information concerning their own and each others positions. In such a situation, it is believed that bargaining between the two parties will eliminate the externality. But this represents a very artificial approach. Who owns the air, the rivers, the forests and therefore has a right to pollute or cut them down? When are all parties equal in power and knowledge? And perhaps crucially, pollution and resource depletion affects everyone in the aggregate but often hits our individual interests in a very small way. Thus, the organisation which is crucial for the aforementioned bargaining to take place is difficult to arrange. This is particularly the case with public goods-"multiple-purpose-multiple-user natural assets, owned in common, which must be managed through some collective choice mechanism if they are to be developed, used and conserved efficiently." Here the obvious choice mechanism is national government. Thus we have the recent issueing here in Ireland of the Action Programme for the Environment which contains a variety of measures aimed at minimising environmental disruption-mainly the treatment or recycling of residuals. However, waste treatment in itself does not reduce the mass of the residuals but only changes their form. Often the treated form of one type of waste becomes the pollutant of another environmental medium. Kneese has pointed out that a number of applied economic studies have indicated that inducement to process redesign and recycling is often far less costly than simple waste treatment and just as effective.

The above discussion is very much concerned with the market system-intrinsically, its failure to adequately price and provide the optimal amount of environmental resources. It has been shown how economics has attempted to explain and correct these market failures. But many would still argue that this is just a case of closing the stable door after the horse has bolted. It could be said that it is the unfettered workings of the market system and the goal of economic growth which is leading to resource depletion and environmental disruption. But yet the unconstrained market economies of Eastern Europe have been notorious for producing very serious environmental problems. Capitalism, therefore, may not be the sole root of ecological disaster.

However, we still link industrial and economic expansion with our pollution problem. This relationship does exist but it should not imply that there is a

simple trade-off between the two. The ecological argument is not a zero-sum game. Beckermann, in his criticism of the 1970's thesis, "A Blueprint for Survival" highlighted this point. In this document, the following relationship was posited:

$$E=f(GDP)$$

where E=ecological demand

implying that resource depletion could be prevented by a fall-off in economic growth. But Beckermann has pointed out, that an equally obvious prescription would be to use some policy instrument to change the nature of the relationship (ie. to change f). It should also be noted that a zero or even negative rate of growth would still involve the input of some natural resources into the economic process, so that there would still be wastes and pollution. All of the anti-growth schools do not consider how price increases induced by scarcity will trigger technological change and the search for substitutes. But then again, who is to say that the price mechanism will suddenly value the environment accurately in the face of scarcity when it does not do so now? The previous arguments for rejecting the anti-growth theses seen much stronger. This brings us back to the quotation highlighted in the beginning. The essence of the solution is adaption and change. Surely, there is much credibility to the argument that resource limits are not fixed but can be extended by human ingenuity.

Economics may or may not have guided us to imminent ecological disaster. A less questionable point is whether it can guide us away again. It seems self-evident that economics, through its analysis and explanation of the problems, and economic activity, through its inducement to technological advancement can provide the buoyancy which will keep us afloat in the "cesspool" of environmental pollution.

Orla McKeon

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An Introduction to Time-Series Modelling

"Forecasting is the art of saying what will happen, and then explaining why it didn't!" (Anonymous, quoted in Chatfield (1989, p.66)).

INTRODUCTION

The purpose of this article is to give the reader a brief introduction to the Box-Jenkins approach to time-series modelling. It is hoped that after reading this article the reader will be able to model his or her own time-series.

Unlike most econometric modelling, time-series analysis involves modelling a dependent variable solely in terms of the past history of itself. The main use of time-series modelling is to estimate future values of the series, or more preferably confidence intervals for the future values. Section 1 will outline two of the most basic concepts used in time-series analysis, namely the ideas of stationarity and the autocorrelation function (acf). Section 2 will introduce some of the basic models of the Box-Jenkins approach, and section 3 will summarize some of the main features of Box-Jenkins modelling. For illustrative purposes section 3 contains an example of a time-series model which I have developed myself. The time-series in question is *The Economist's* Metals Dollar Index for 1987, 1988 and 1989. Observations occur weekly, and for the purposes of determining the predictive power of my model I have omitted the last 8 observations. Further details of the index can be found in *The Economist* of 12 March 1988, 6 May 1989 and 6 January 1990.

1. BASIC CONCEPTS

The principle of *stationarity* is one of the most basic principles needed for time-series modelling. *A stationary time-series is one whose characteristics are invariant with respect to time.* More mathematically, the concept of stationarity is defined as follows. For a stochastic process to be stationary the following conditions must be satisfied for all values of t:

$$E(y_t) = \mu,$$
$$E[(y_t - \mu)^2] = \pi(0),$$
$$E[(y_t - \mu)(y_{t-k} - \mu)] = \pi(k), \quad k=1,2,....$$

where μ, $\pi(0)$, and $\pi(k)$ are all constant. If any of these conditions are not satisfied then the characteristics of the process will tend to change with time. One can intuitively see that a stationary time-series is much easier to estimate and to forecast with, and Box-Jenkins modelling (which I shall introduce later) relies crucially on the time-series being stationary.

Most economic time-series are not stationary. Many involve an upward trend (prices, for example), so immediately the first condition required for stationarity is broken (i.e. the average of the process is increasing with time). Fortunately, however, there are methods which can sometimes be used to derive a stationary process from a non-stationary one which I shall mention later.

The *autocorrelation function* (acf) is obtained by plotting

$$P(k) = \pi(k)/\pi(0)$$

against k, k=1,2,....., where $\pi(k)$ is the autocovariance between y_t and y_{t-k} as defined before, and $\pi(0)$ is a scaling factor. In practice, of course, we only have estimates of the values of $\pi(k)$ and consequently we only have an estimate of the acf, usually called the *correlogram* or the *sample autocorrelation function.* If T is the number of observations and μ is the sample average then the correlogram is denoted by

$$r(k) = c(k)/c(0), \quad k=1,2,...$$
$$\text{where } c(0) = T^{-1}\Sigma(y_t - \mu)^2$$
$$\text{and } c(k) = T^{-1}\Sigma(y_t - \mu)(y_{t-k} - \mu), \quad k=1,2,.....$$

As we shall see later, the correlogram is one of the main tools used in trying to identify time-series models.

2. AR, MA, ARMA AND ARIMA PROCESSES

The processes most used in time-series modelling are *autoregressive integrated moving average* (ARIMA) processes. I will look at autoregressive and moving average processes separately, before combing them to get ARMA and ARIMA processes.

An autoregressive process of order p is written as

$$y_t = \emptyset_1 y_{t-1} + \ldots\ldots + \emptyset_p y_{t-p} + e_t,$$

where the e_t's are normally distributed random variables with mean zero and constant variance. More concisely,

$$\emptyset(L)y_t = e_t,$$

where $\emptyset(L) = 1 - \emptyset_1 L - \emptyset_2 L^2 - \ldots\ldots - \emptyset_p L^p$.

(L is known as the *lag operator* and is defined as

$$Ly_t = y_{t-1},$$

so obviously $L^j y_t = y_{t-j}$). This is usually denoted AR(p).

For example,

$$y_t = \emptyset y_{t-1} + e_t$$

is an AR(1) process. Since

$$\begin{aligned} y_t &= \emptyset y_{t-1} + e_t \\ &= \emptyset^t y_0 + \emptyset^{t-1} e_1 + \ldots. + \emptyset e_{t-1} + e_t, \end{aligned}$$

then $E(y_t) = \emptyset^t y_0$

If $|\emptyset| < 1$ and if the process started a long time ago (i.e. t is large), then

$$E(y_t) = E(y_{t-1}) = 0.$$

However, if $|\emptyset| > 1$, then $E(y_t)$ grows exponentially, so the process is non-stationary. In fact if $\emptyset = 1$, the process is also non-stationary, so y_t is stationary if and only if $|\emptyset| < 1$. Stationarity for higher order processes is harder to envisage, but it can be shown that for an AR(p) process to be stationary the roots of the polynomial equation

$$1 - \emptyset_1 L - \emptyset_2 L^2 - \ldots\ldots - \emptyset_p L^p = 0$$

must lie outside the unit circle. (This allows for complex roots). A proof of this for p = 2 is outlined in Harvey (1981, pp. 29-32). Notice that for the AR(1) process, P(k) decays geometrically as k gets large. The same is true for an AR(p) process, but for small k, P(k) depends very much on the values of $\emptyset_1, \ldots\ldots, \emptyset_p$ and little can be said in general about the first few values of the acf.

In contrast to an autoregressive process, a moving average process relates y_t to previous values of the error term e_t. More formally, an MA(q) process is written as

$$y_t = \beta_1 e_{t-1} + \ldots\ldots + \beta_q e_{t-q} + e_t,$$

or more concisely

$$y_t = \beta(L)e_t,$$

where $\beta(L) = 1 + \beta_1 L + \ldots\ldots + \beta_q L^q$. It is easy to see that a finite moving average process is always stationary, since y_t is uncorrelated with y_{t-k} for k>q. Thus the autocorrelation function of an MA(q) process will suddenly drop to zero for k>q.

Combining autoregressive and moving average processes we get processes of the form

$$\begin{aligned} &y_t = \emptyset_1 y_{t-1} + \ldots. + \emptyset_p y_{t-p} + e_t + \beta_1 e_{t-1} + \ldots. + \beta_q e_{t-q}, \\ &\text{or } \emptyset(L)y_t = \beta(L)e_t. \end{aligned}$$

These are called ARMA(p,q) processes. For the process to be stationary we only require that the autoregressive part be stationary. In terms of the autocorrelation function, the only thing that can be said in general is that for k>q the acf is going to behave exactly as the acf of the autoregressive part of the process, i.e. it decays geometrically towards 0 for k>q.

I hinted when talking about stationarity that some non-stationary processes can be made stationary. Consider the following non-stationary process:

$$y_t = y_{t-1} + e_t.$$

Although the process is non-stationary, we see that if we let

$$z_t = y_t - y_{t-1}$$
$$\text{then } z_t = e_t,$$

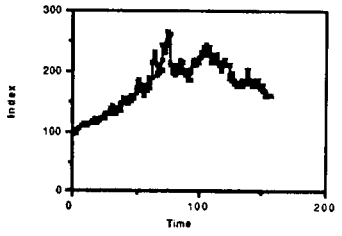
so z_t (the *differenced* process) is stationary. More generally it is sometimes possible to difference a non-stationary process d times to derive a stationary process. Such a process is denoted ARIMA(p,d,q), an autoregressive *integrated* moving average process. Such a process can be written as

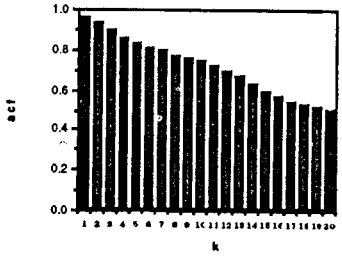
$$\emptyset(L)\Delta^d y_t = \beta(L)e_t,$$
$$\text{where } \Delta y_t = y_t - y_{t-1},\ \Delta^d y_t = \Delta^{d-1} y_t - \Delta^{d-1} y_{t-1}.$$

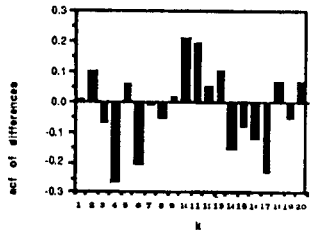
MODEL BUILDING AND ESTIMATION

Suppose we want to fit an ARIMA(p,d,q) model to a data set $\{y_t\}$. Box & Jenkins (1970) suggest a methodology for finding the best such ARIMA process. They suggest first making a tentative guess as to the values of p, d and q, then estimating the parameters, and finally subjecting the model to diagnostic tests to see if there is a significant divergence between the estimated model and the actual data.

The first stage is to make a guess as to what the values of p, d and q might be. The way that this is done is to examine the acf, or rather its approximation the correlogram, the characteristics of which should give us some hints about what values p, d and q might take on. The determination of d is probably the easiest part. For an ARMA process to be stationary the correlogram should be close to the zero for large k. If this isn't the case, the data should be differenced as many times as necessary until we think the model is stationary. Consider the Metals Dollar Index which I introduced earlier. Figure 1 shows the time-series plot of the data. The data appears to be non-stationary, and the correlogram bears this out (see figure 2 - the correlogram is not decaying towards zero). Thus differencing is required. Figure 3 shows the correlogram of the differenced data. Obviously differencing has produced a stationary model. Thus we can conclude that d=1.







To determine p and q is much harder. Box & Jenkins admit that this stage of their methodology is more like an art than a science. It is very hard to determine what p and q might be even from the acf, never mind the correlogram. Usually, though, we can narrow the possible models down to two or three (especially if p and q are low, which will usually be the case), and then we can use diagnostic tests to determine which is best. Pindyck & Rubinfeld (1976) show that for c(k) to be significantly different from zero its absolute value must be greater than $2/n^{1/2}$ (in the case of our example, approximately 0.164). One of the few values of k that attains this value is k=4. Similarly, the partial autocorrelation

function (which is similar to the acf, except the characteristics of the AR and the MA parts of the process are reversed) suggest that k=4 is important (although I haven't provided a diagram). Thus I am going to suggest that the best model to fit the data is either ARIMA(4,1,0), ARIMA(0,1,4) or ARIMA(4,1,4). Further analysis may isolate one model.

Having tentatively suggested values for p,d and q the next stage is to estimate the values of the parameters. It is usual to assume that the white noise errors e are independently and identically distributed. Unfortunately, estimation of the parameters of an ARMA process involve non-linear maximum likelihood techniques. I do not propose to discuss the details here, but the interested reader is referred to Harvey (1981, pp.124-130) or to Pindyck & Rubinfeld (1976, pp.481-489). From a practical point of view, however, most computer statistical packages will carry out the estimation automatically, so the non-specialist reader need not worry about the details. For my model, the following results were produced:

For the ARIMA(4,1,0) model,

$$E(y_t) = 0.0027y_{t-1} + 0.1318y_{t-2} - 0.0652y_{t-3} - 0.2665y_{t-4},$$

for the ARIMA(0,1,4) model,

$$E(y_t) = 0.0452e_{t-1} + 0.0679e_{t-2} - 0.0307e_{t-3} - 0.2936e_{t-4},$$

and for the ARIMA(4,1,4) model,

$$E(y_t) = -0.3722y_{t-1} + 0.4017y_{t-2} + 0.0269y_{t-3} - 0.2021y_{t-4} + 0.4272e_{t-1} - 0.2969e_{t-2} - 0.0706e_{t-3} - 0.1370y_{t-4}.$$

Sometimes we can eliminate a model at this stage if we discover that it is non-stationary. However, all of the models above are stationary (a result which I won't prove).

Since we have assumed that the residuals of the true process are white noise (i.e. distributed normally and independently of each other) then it seems logical that we should use this assumption to test the model. The best way to do this is to use the Box-Pierce test. Denote the correlogram of the residuals by r_k

$$\text{i.e. } r_k = (\Sigma e_t e_{t-k})/(\Sigma e_t^2)$$

where e_t are the estimated residuals. If the model is correctly specified, then for large k the residual autocorrelations r_k are themselves uncorrelated, normally distributed random variables with mean 0 and variance T. Thus the statistic

$$G = T\Sigma r_k^2$$

is approximately chi-squared distributed with K-p-q degrees of freedom, and so by subjecting G to a chi-squared test we can decide whether to accept the model or not.

The computer package which I used for my model (namely MINITAB) produces Box-Pierce statistics for K=12, 24, 26, 48. Unfortunately this test failed to eliminate any of the models (for example, for K=48, G=49.9 for the ARIMA(4,1,0) model. The 95% confidence interval for a chi-squared distribution with 44 degrees of freedom is approximately (29.4,53.3), which G easily falls within), so to evaluate how well each of the models work, compare the predicted future values with the actual values for each model from the table below. Once again, MINITAB produces forecasts of the future values, so there is no point going into the theory behind the forecasting.

Actual Value	ARIMA(4,1,0)	ARIMA(0,1,4)	ARIMA(4,1,4)
174.0	175.1	175.6	175.7
173.0	175.2	175.3	175.9
166.6	177.1	177.7	177.9
165.6	177.7	178.1	177.7
160.8	178.4	178.1	178.8
159.6	178.3	178.1	178.3
158.4	177.9	178.1	178.5
160.5	177.6	178.1	178.3

As a crude measure of how each model performed, the ARIMA(4,1,0) model was out by an average of 7.6% for the 8 observations, the ARIMA(0,1,4) by 7.8% and the ARIMA (4,1,4) by 7.9%. From these measures the ARIMA model is the best, but there is very little to distinguish between the three of them. Although I haven't included them, the actual values all fall withing the 95% confidence intervals for all three models. Notice that the predictions for the first two observations were quite good in each case, but not quite so good after that.

This approach hasn't isolated a single model for my time-series, but rather has given us three potential ones. Remember, time-series modelling is used mainly for short-term forecasting, so having three potential models doesn't pose any real problems - we could just take an average of the three forecasts. The model that I have used isn't very susceptible to time-series modelling and was used purely for illustrative purposes; something like ice-cream sales for the past three years would be a lot more striking. Despite this my model has thrown up some potentially useful forecasts, although I wouldn't advise any reader to use them for arbitrage purposes!

CONCLUSION

The purpose of this article was to give the reader a flavour of the intricacies of time-series modelling. Computer packages such as MINITAB or SPSSX take much of the drudgery out of time-series analysis. The reader who is interested in exploring the theory in more detail is referred to Pindyck & Rubinfeld (1976) for a fairly readable introduction. More advanced material is to be found in Harvey (1981) and Chatfield (1989), while the original work on the subject is found in Box & Jenkins (1970).

Karl Murphy

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Alternative Linear Disturbance Estimators in Linear Regression Analysis

Given the usual linear model, $Y=X\beta+\varepsilon$, Y being an nx1 vector of values of a resultant variable, X a fixed nxp matrix $[x_{ij}]$ such that x_{ij} is the i^{th} value of the j^{th} explanatory variable, β is a px1 vector of parameters ε an nx1 vector of errors $\varepsilon \sim N(0,\sigma^2 I)$ and X being of rank p,p<n. Then b, the OLS estimator of β is $b = (X'X)^{-1}X'Y$

Define M to be the matrix $I-X(X'X)^{-1}X'$, which is trivially idempotent

$tr(M) = tr(I) - tr\,(X(X'X)^{-1}X')$

$tr(M) = tr(I_n) - tr(I_p) = n-p$

So the trace of M is n-p, so its rank is n-p and it has n-p eigenvalues of unity, the rest being zero. The vector of residuals is

$e = Y - Xb = Y - X(X'X)^{-1}X'Y = MY$

$e = MY$ .So $e = MX\beta + M\varepsilon$

But $MX = 0$

$e = MY = M\varepsilon$

Regression analysis in common with much other statistical analysis (such as ANOVA) uses the residuals as estimators[1] of the true disturbances in a battery of testing procedures. Hence it is important to examine the properties of those residuals and, where they are in any sense unsatisfactory, to consider alternatives. This study is motivated by the fact that even given homoscedastic serially uncorrelated errors with a fixed dispersion matrix as in this model, the residuals follow a heteroskedastic, autocorrelated data dependent distribution as is seen from the result below

$e = M\varepsilon$

So e is normal and unbiased

$E(ee') = E(M\varepsilon\varepsilon'M')$

$= \sigma^2 MM'$

$V(e) = \sigma^2 M$

$e \sim N(0,\sigma^2 M)$ where M is data dependent and not generally scalar. In this paper lengthy proofs are not given but marked by an asterix. The proofs have been submitted to the review and are available from the author or the editor.

However the least squares residual vector is the best linear (in Y) unbiased residual vector. Let j be any other residual vector AY

$E(AY) = 0 \Rightarrow AX\beta + E(\varepsilon) = 0 \Rightarrow AX = 0$ and $AY = A\varepsilon$

Let $A = A^* + M$

$\o(\o(\Sigma, I), I)(j) = \o(\Sigma, I)[(j-\varepsilon)(j-\varepsilon)']$ 2

$= \o(\Sigma, I)[(A-I)\varepsilon\varepsilon'(A-I)]$

$= \sigma^2(A-I)(A-I)'$

$= \sigma^2(A^*+M-I)(A^*+M-I)'$

$= \sigma^2(A^*+X(X'X)^{-1}X')(A^*+X(X'X)^{-1}X')'$

$= \sigma^2 A^{*}A^* + \sigma^2 X(X'X)^{-1}X'$, because $A^*X = AX - MX = 0$

$\o(\Sigma, I)(j) = \sigma^2 A^{*}A^* + \sigma^2$

For e, $A = M$ so $A^* = 0$ so $\o(\Sigma, I)(e) = \sigma^2(I-M)$

So as $A^{*}A^*$ is symmetric and hence positive semidefinite. $\o(\Sigma, I)(e)$ exceeds

$\o(\Sigma, I)(j)$ by a positive semidefinite matrix for any j and the result is hence proven.

The class of alternative disturbance estimators is the set of residuals which are linear in Y, unbiased and have scalar fixed dispersion matrices. Such vectors are written as CY where C is of order qXn. A necessary and sufficient condition for such a vector to be unbiased is that CX=O because

$$E[CY] = 0 \Rightarrow E[CX\beta + C\varepsilon] = 0 \Rightarrow CX = 0$$

Let D be the fixed scalar dispersion matrix. Without loss of generality let $D = \sigma^2 I$ (because this can be achieved by scalar multiplication of C). It is a necessary and sufficient condition for $\o(\Sigma, I)[CY]$ to be $\sigma^2 I$, that $CC' = I$, because

$$E[CYY'C] = \sigma^2 I \Rightarrow C\sigma^2 C' = \sigma^2 I \Rightarrow CC' = I$$

An important result for LUS residuals is that $CY = C\varepsilon - Ce$ as may thus be shown:

$$CY = C[X\beta+\varepsilon]$$

$$\Rightarrow CY = C\varepsilon$$

$$\Rightarrow MC' = [I - X(X'X)^{-1}X']C'$$

But $X'C' = 0$

$$\Rightarrow MC' = C'$$

$$\Rightarrow CM = CM' = C$$

$$\Rightarrow CY = CMY$$

$$\Rightarrow CY = C\varepsilon = Ce$$

The fact that $CX = 0$ implies that the n columns of C are subject to p linear dependencies. So

$$\text{rank}[C] = n-p$$

$$\text{rank}[C] = \text{rank}[CC']$$

$$\text{rank}[CC'] \leq n-p$$

But $CC' = I$, of order qXq of full rank

$$\text{rank}[I] = \text{rank}[CC'] = q$$

$$q \leq n-p$$

It is clearly desirable for the number of rows of C to be as close as possible to n-p. This result tells us that q is at most n-p, not that this maximum can be obtained. M has n-p eigenvalues of unity, the rest being zero. Let $q_1..q_{n-p}$ be the eigenvectors corresponding to the unit eigenvalues. If C is an n-pxp matrix, the rows of which are $q_1...q_{n-p}$, then CY is a LUS residual vector. This result hence shows that the maximum can be obtained. It is proven thus

$$(M-I)C' = 0$$

$$\Rightarrow X(X'X)^{-1}X'C' = 0$$

$$\Rightarrow CX = 0$$

CY is linear in Y

$$CY = Ce$$

$$V(CY) = V(Ce)$$

$$=E[Cee'C']$$

$$V[CY] = \sigma^2 CMC'$$

But C orthogonally diagonalises M and the eigenvalues of M corresponding to the columns of C' are all unity.

$$V[CY] = \sigma^2 I$$

So CY is a vector of LUS residuals. The rows of C are clearly pairwise orthogonal and of length σ^2 in this case.

Since the maximum number of rows of C, n-p, can always be attained we always choose C to be of order n-pxn. For p observations there are no LUS residuals, this operation is defined as the base.

It is logical then to proceed to attempt to derive a LUS residual vector satisfying certain optimality conditions. One of the widely used classes of LUS residuals, the BLUS residuals of Theil (1965, 1968) satisfy such conditions. Consider the partitioning of X as $[X_0|X_1]$ where X_0 represents those rows corresponding to observations in the base, e being correspondingly partitioned. Let the eigenvalues of $X_0(X'X)^{-1}X_0'$ be written in order of increasing magnitude as

$$d_1^2 \leq d_2^2 \ldots\ldots \leq d_p^2$$

and let q_i be the i^{th} eigenvector of $(X_1X_0^{-1})(X_1Xo^{-1})'$. Then the BLUS residual vector is

$u_1 = e_1 - X_1X_0^{-1}($ \I\su(i=1,h\s(2),) \f(d_i,1-d_i) $q_iq_i')e_o$

which, it may be proved*

(i) is a LUS residual vector.

(ii) is unique

(iii) minimises the expected sum of square errors, i.e. if v_1 is any estimator of ε_1, $E[(v_1 - \varepsilon_1)'(v_1 - \varepsilon_1)] \geq E[(u_1 - \varepsilon_1)'(u_1 - \varepsilon_1)]$, this property being known as weak optimality.

An attempt was made in Theil(1968) to show strong optimality, i.e. that $\o(\Sigma,I)(v_1) \geq \o(\Sigma,I)(u_1)$ for all v_1, an estimator of e_1. The proof is not generally correct; it entails an added constraint on v_1. Grossman and Styan (1970) disproved strong optimality for BLUS residuals. While weak optimality implies that

$$tr[\o(\Sigma,I)(v_1)] \geq tr[\o(\Sigma,I)(u_1)],$$

because strong optimality is not a property of BLUS residuals, we cannot even be sure that the diagonal elements of $\o(\Sigma,I)(u_1)$ do not exceed the corresponding elements of $\o(\Sigma,I)(v_1)$, for some v_1. If $\lambda_j[A]$ is the j^{th} largest eigenvalue of A, Grossman and Styan (1970) did show that

$$\lambda_j[\o(\Sigma,I)(v_1)] \geq \lambda_j[\o(\Sigma,I)(u_1)] \ *$$

but this is little more than a mathematical curiosum.

The weak optimality condition applies only, however, to LUS residuals. By the result given earlier, if a_1 is any vector of estimators of ε_1, $\o(\Sigma,I)(a_1) \geq \o(\Sigma,I)(e_1)$. So $ES(a_1) \geq ES(e_1)$. A convenient scalar measure of the difference between these two quantities is the ratio of $ES(e_1)$ to $ES(a_1)$ which Abrahamse and Koerts (1970)define as the efficiency of a_1. The efficiency of u_1 is \F(\I\SU(i=1,h,(1-d_i^2)),2\I\SU(i=1,h,(1-d_i))) , as may be shown thus

$\o(\Sigma,I)(u_1) = 2\sigma^2$\i\su(i=1,h,(1-di)) p_ip_i', writing in scalar format, since d_i = 1 for all i>h

$ES(u_1) = tr(u_1) = 2\sigma^2$\i\su(i=1,h,(1-$d_i$))

$\o(\Sigma,I)(e_1) = \sigma^2 X_1(X'X)^{-1}X_1'$

$ES(e_1) = \sigma^2 tr[\o(\Sigma,I)(e_1)]$

$= \sigma^2 tr[X_1(X'X)^{-1}X_1'] = \sigma^2 tr[(X'X)^{-1}X_1'X_1]$

$= \sigma^2 tr[(X'X)^{-1}(X'X - X_0'X_0)]$

$= \sigma^2 p - \sigma^2 tr(N^{-1})$

$\Rightarrow ES(e_1) = \sigma^2$ \i\su(i=1,h,1-d_1^2)

$\Rightarrow$ \f(ES(e$_1$),ES(u$_1$)) = \f(\i\su(i=1,h,1-d$_i$^{2}),2\i\su(i=1,h,(1-d$_i$)))

Implicit in any vector of disturbance estimators is a vector of coefficients estimators. For u_1, this is β^*_1 such that $u_1 = y_1 - X_1\beta^*_1$

$$u_1 = e_1 - X_1X_0^{-1}[\i\su \quad (i=1,h,\f(d_{i,}1-d_i)) \; q_iq_i'] \; e_o$$

$$u_1 = Y_1 - X_1b + X_1X_0^{-1}[\i\su \quad (i=1,h,\f(d_{i,}1-d_i)) \; q_iq_i'] \; e_o$$

$$X_1\beta^*_1 = X_1b + X_1X_0^{-1}[\i\su \quad (i=1,h,\f(d_{i,}1-d_i)) \; q_iq_i'] \; e_o$$

$$\Rightarrow \beta^*_1 = b + X_1X_0^{-1}[\i\su \quad (i=1,h,\f(d_{i,}1-d_i)) \; q_iq_i'] \; e_o$$

Trivially, $E(\beta^*_1) = \beta$ but \o(Σ,I)(β^*_1) $\geq$ \o(Σ,I)(b_1) by the Gauss-Markov Theorem.

All this analysis of BLUS residuals is however dependent on the choice of base. Ignoring the nonsingularity requirement for X_o, there are ^nC_k possible choices of base. The approach to the use of residuals suggested by Theil (1968) is to first of all identify the set of all possible bases and then to select that one which minimises the expected error sum of squares. If the set of all possible bases is the set of all bases for which X is nonsingular, then the computational cost of this will be very high, but for many applications, other constraints will exist (e.g. that the base must be in the centre of the ordered predictors). The large number of possible bases is one general objection to the BLUS procedure. Another fundamental one is the fact that the dispersion matrix of the BLUS residual vector exceeds that of the least squares one by a positive semidefinite matrix. Finally, p observations have no BLUS residuals. The second of these is probably the most serious because computational advances lessen the first problem and because n is typically much greater than p. A measure of the gravity of this problem is the efficiency of the BLUS residual vector.

The recursive residual vector is another member of the class of LUS residual vectors. Let $b_{(r)}, X_{(r)}, y_{(r)}$ be b, X and y with only the the first r observations, r>p. The r^{th} recursive residual is defined as

$$Pr = \f(y_r - X'_{(r)}b_{(r-1)}, \r(1+x'_r(X'_{(r-1)}X_{(r-1)})^{-1}x_r)) \quad , r \varepsilon \{p+1.....n\}$$

The computation of recursive residuals is greatly simplified by the result [proved in Harvey(1981)]

$$(X'_{(r)}X_{(r)})^{-1} = (X'_{(r-1)}X_{(r-1)})^{-1} - \f((X'_{(r-1)}X_{(r-1)})^{-1}x_rx'_r(X'_{(r-1)}X_{(r-1)})^{-1}, 1+x'_r(X'_{(r-1)}X_{(r-1)})^{-1}x_r)$$

which means that only one matrix inversion is needed to compute a whole set of recursive residuals. Hence, as is shown in Brown, Durbin and Evans(1975)

$b_r = b_{r-1} + (X'_{(r)}X_{(r)})^{-1}x_r(y_r - x'_rb_{r-1})$, this being the explicit recursion formula used to compute $\{w_{p+1}.....w_n\}$

Parallel to the problems of BLUS residuals, recursive residual vectors have variance-covariance matrices exceeding those of the corresponding least squares ones by a positive semidefinite matrix and that the first p observations have no recursive residuals.

A generalisation of the LUS class of residual vectors is the LUF class. These are disturbance estimators which are linear in Y, unbiased and which have dispersion matrices $\sigma^2\Omega$ which are not data-dependent and which are hence fixed. But it is clearly desirable that certain properties of $\sigma^2\Omega$ mirror those of σ^2M. Following Abrahamse and Koerts (1971), Ω is required to be idempotent and of rank n-p.

Let M(X) be the space spanned by the columns of X and let v be a LUF

residual vector, $\Psi'Y$, Ψ being of order n-pxn-p. So

$E(\Psi'Y) = 0 \Rightarrow \Psi'X = 0$

So the columns of Ψ' are elements of M(X)', the orthogonal complement of M(X). By the dimension theorem, if T is a linear transformation from the vector space V to the vector space W then the sum of the rank and nullity of T is equal to the dimension of V. Hence the sum of the rank of Ψ and the dimension of the solution space of $\Psi'X=0$ is n, so the dimension of M(X)' is n-p. Besides, clearly,

$E(vv') = E(\Psi'yy'\Psi) = \sigma^2\Psi'\Psi = \sigma^2\Omega \Rightarrow \Psi\Psi'=\Omega$

Let K be that nxn-p matrix the columns of which are the eigenvectors corresponding to the unit eigenvalues of Ω and let P be that nxn-p matrix the columns of which are the eigenvectors corresponding to the unit eigenvalues of M. Then Abrahamse and Koerts show that the residual vector

$K[K'MK]^{-\frac{1}{2}} K'MY$

is a LUF vector satisfying weak optimality, and that it is unique.

Consider a reformulation of the OLS model in which A is an nxn-p matrix of rank n-p the columns of which span M(X)'. Xb must be an element of M(X) in OLS. But Xb is an element of M(X) iff $A'Xb=0$. Defining λ as a column vector of n-p Lagrange multipliers the estimation of b in OLS can be reformulated as the constrained optimisation of the minimisation with respect to β of $(y-X\beta)'(y-X\beta)$ subject to $A'X\beta=0$, equivalent to the Lagrangian minimisation of $(y-X\beta)'(y-X\beta)-2\lambda'A'X\beta$, the solution being b, $\hat{\lambda}$. By Harrison and Keogh(1984)

$Xb= [I - A(A'A)^{-1}A']X\beta$, $\hat{\lambda}= (A'A)^{-1}A'Y$, $\hat{\lambda}\sim N(0,\sigma^2(A'A)^{-1})$

As $\hat{\lambda}$ is linear in y, unbiased and has a fixed dispersion matrix, it has an interpretation as a set of LUF residuals. Letting $A=D(D'D)^{-1}$ $\hat{\lambda}= ((D'D)^{-1} D'D(D'D)^{-1})^{-1} (D'D)^{-1}D'Y = D'D(D'D)^{-1} D'Y =D'$. So, any LUF residual vector may be generated in this way and so any LUS residual vector may too provided that $A'A=I$.

The process of finding LUF residual vectors differs very fundamentally from that for LUS residuals. The matrix P is data dependent. For generating LUF residuals in a particular set of analyses we must specify typical matrices such that for any one application this will be a good approximation. Since P is a basis for M(X), finding a typical P matrix is equivalent to finding a typical X matrix. Once the typical X matrix has been specified for any field, then given the nonsingularity of K'P, v is uniquely determined. The issue of choice of base does not even arise.

A typical X matrix is not necessarily given however. Intuitively, indeed this is likely to be quite unusual. But one case where it does exist is for slow trending time series which Theil and Nagar (1961) argue is quite common. X, in this case, can be approximated by the eigenvectors of the matrix A ,$[q_{ij}]$ which is of order nXn, where

$q_{ii} = 2$ for all $i \in \{2,....n-1\}$, $q_{ii} =1$ for $i \in \{1,n\}$ and $q_{ij}=-1$ for all i,j such that $|i-j|=1$; all other elements of the matrix being zero.

This is because the eigenvectors of A have a "slowly changing" character, so X may behave like the eigenvectors of A. P is a matrix of eigenvectors of M corresponding to the unit eigenvalues of M, so it spans the orthogonal complement of the space spanned by X, because as has been shown $KP'X=0$. So P behaves like the eigenvectors corresponding to the n-p largest eigenvalues of A. Let the matrix, the columns of which are these eigenvectors be L, of order nxn-p. It follows that it is reasonable to choose L for the matrix K, and Ω is thus LL'.

Von Neumann (1941) showed that the eigenvectors of A are given by h_i =

\f[1,c_i] [Cos\f[π(i-1),2n) , Cos\f[3π(i-1),2n) ,.....,Cos\f[(2n-1)π(i-1),2n)]

c_1 = \r(n) , c_i = \r(\f[n,2]) for all i ε{2....n}

corresponding to the eigen values 2[1 - Cos \f[π(i-1),n)] , i ε{1.....n}. L is hence [h_{p+1}.....h_n] .*

The theory of LUF residuals however relies on Ω being determined *a priori* and so the typical X matrix must be too. This is the major limitation of LUF residuals. A typical X matrix may not exist in a given field of learning. But, more critically, the fact of the typical X matrix being determined *a priori* means that the analyst may not be influenced by the extent to which his X matrix satisfies the requirements to be "typical" in the given field of learning without undermining the statistical validity of the procedures. If he finds that the X matrix is completely different from that which he expected, *ex ante*, if he modifies his beliefs about what X matrix is "typical" in that field of learning, then it can no longer be assumed that Ω is fixed and the theory of LUF residuals breaks down.

Given the central role of disturbance estimators in econometric specification and misspecification testing, alternative disturbance estimators can clearly be applied to a battery of testing procedures including tests for heteroskedasticity, serial correlation, concavity, convexity, general non-linearity or structural change over time, as well as to misspecification tests. Length being constrained, not all these applications can be examined.

Exact parametric tests of heteroskedasticity, using LUS residuals, were proposed by Theil (1971) and Phillips and Harvey (1973), the former using BLUS residuals, the latter employing recursive ones. If σ^2 = Var(ε_j) = σ^2f(j) then the null is that f(j) is unity for all j and H_A is that there exists some j such that f(j) $\neq$ 1. For power studies, writers have confined themselves to more restricted forms of heteroskedasticity.

Let the observations be ordered in non-decreasing values of σ^2_j , according to an alternative hypothesis. Let a regression be run on the first and last m observations, 2m$\leq$n [2m<n, for n odd], yielding residual vectors e_1 and e_2 respectively. The Goldfeld-Quandt test statistic is

R = \f[e'$_2$e$_2$,e'$_1$e$_1$) = \f[e'E$_2$e,e'E$_1$e) , where E_2 = \b(\a\co2(0 ,0,0 ,I_m)) , where E_1 = \b(\a\co2(I_m ,0,0 ,0)) , where I_m is the identity matrix of order mXm.

$\Rightarrow$ R = \f[εM'E$_2$Mε,ε'M'E$_1$Mε)

But M'E$_2$M and M'E$_1$M are trivially idempotent

$\Rightarrow$ e'$_2$e$_2$ ~$\sigma^2\chi^2_m$, e'$_1$e$_1$~$\sigma^2\chi^2_m$

e'$_1$e$_1$ and e'$_2$e$_2$ are independent

R ~$F_{m,m}$

Testing may hence be conducted. Discarding central observations has been found to increase power, for example by Phillips and Harvey.

The procedures of Theil (1971) and Phillips and Harvey (1973) adapt this test for LUS residuals, represented by a vector w. As the discarding of the central observations increases power, it follows that, for n-p even the central p observations be used as the base and for n-p odd, one of the two possible sets of central p observations be used. In this way the disadvantage of LUS residuals (that observations in the base do not have corresponding residuals) can be mitigated. Phillips and Harvey (1973, 1974) allow for the possibility of discarding more observations than are in the base; thereby increasing the number of possible bases. In the context of computationally expensive BLUS residuals this seems unlikely to be desirable, so Theil (1968, 1971) does not allow for this: the more possible bases we consider the greater the computational cost. Theil then

suggests that a BLUS residual vector be computed for each [one or two] admissible base, the one with the lower expected error sum of squares being selected. In this paper, the approach of Theil is initially followed, so two regressions are run; one on the observatons before the base [p elements] and one on the observations after it, yielding LUS residual vectors w_1 and w_2 respectively. The ratio for either BLUS or recursive tests is then

$S = \frac{(w_2'w_2, w_1'w_1)}{}$

depending on whether $\frac{(w_1, w_2)}{}$ are BLUS or recursive residual vectors. Clearly $w_2'w_2 \sim \sigma^2\chi^2_{n}, w_1'w_1 \sim \sigma^2\chi^2_{m}$, where w_1 and w_2 are of length m and n respectively.

$E[w_1'w_2]=0$

$w_2'w_2$ and $w_1'w_1$ are independent, because

$S \sim F_{n,m}$

and so testing may be conducted by comparison with the critical values of an $F_{n,m}$ variate.

Harvey and Phillips (1974) is an important discussion of the relative merits of these three tests. The BLUS residuals have the least expected sum of squared estimation errors, but there is no theoretical reason why this should imply that a test based on them will be most powerful. The recursive residuals, on the other hand, are easier to obtain. Harvey and Phillips claim that tests based on recursive or BLUS residuals are more flexible than the Goldfeld-Quandt test as recursive or BLUS residuals may be used with different orderings of the observations, while least squares residuals may not. They however provide no theoretical or empirical support for this claim. Changing the order of observations changes the set of admissable bases; but if one set of LUS residuals is used with different orderings of the bases, then only the base in the first test will necessarily be admissable. Even if other bases are, by chance, admissable, the BLUS residual vectors they yield will not necessarily satisfy weak optimality. It seems plausible, hence, that using different orderings without fresh bases may cause a loss of power, and the phenomenon may hence merit further study. Harvey and Phillips use the procedure of Imhof (1961) to compute the power of S under various alternative hypotheses. The procedure enables this to be done exactly, since S is a quadratic form in random normal variables. They drew the following key conclusions.

(i) For designing the most powerful test it is optimal to discard around max $(p, \frac{(n,3)}{})$ central observations, this optimum being relatively flat.

(ii) The tests based on BLUS residuals dominate those based on recursive residuals in power, but the difference is very small and probably does not justify the extra computatonal cost of the former.

(iii) All conclusions are quite robust to the specification of the heteroskedasticity.

(iv) No overall conclusion may be drawn as to the relative power of those tests and the Goldfeld-Quandt test.

Ramsey (1969) discusses a number of specification tests involving LUS residuals. Only one is claimed to be sensitive to simple heteroskedasticity. This is essentially a special case of Bartlett's M Specification Error Test [BAMSET]. Defining $z_1 \ldots z_{n-p}$ to be the coordinates of a vector of LUS residuals, z, the set of n-p LUS residuals is divided into t non-intersecting subsets, such that the residuals in the j^{th} set have a sum of squares L_j and N_j elements are in this set. Define

$s^2_j = \frac{(L_j, N_j)}{}$, $s^2 = \frac{(\sum(j=1,t, N_j s_j^2), n-p)}{}$, $j \in \{1 \ldots .t\}$

The null specified by Ramsey is that $z^2_j \sim \sigma^2\chi^2_1$, $j \in \{1, \ldots\ldots, n-p\}$ while H_A is

$z_j^2 \sim \sigma_j^2 \chi^2_1$, with $\sigma_j 2$ not equal for all j, He shows that the test statistic

$$n\text{-}p \log s^2 - \sum_{j=1,t,N_j} \log s^2_j \sim \chi^2_{t-1},$$

and testing may hence be conducted. Unfortunately the power of this test may not be computed using the method of Imhof (1961). The specification of the null and alternative hypotheses is significantly different from that used by other writers and has the disadvantage that, as many misspecifications imply z^2_i to be distributed as non-central χ^2, the test is not defined for these cases. Ramsey (1969) notes that this is the case if there is functional misspecification or underspecification.

Brown, Durbin and Evans (1975) propose a test for structural change over time based on recursive residuals. Formally, the null is that β and σ^2 are constant over time, and H_A is that they are not (although a variety of one-sided procedures could be devised if desired). Let the set of recursive residuals be $\{v_t\}, t \in \{p+1, \ldots, n\}$. Two alternative statistics may then be computed, known as the cusum and cusum squared test statistics,

$$w_j = \sum_{t=p+1,j} v_t \Big/ \sum_{t=p+1,n} v_t \quad \text{and} \quad s_j = \sum_{t=p+1,j} v_t^2 \Big/ \sum_{t=p+1,n} v_t^2$$

respectively, for the j^{th} observation. Consider a plot of w_j against j. Under the null, over time, it should be close to zero. Applying the theory of Brownian motion in statistical mechanics they showed that there is an α% probability that some point will be above line A or below line B, under the null where line A goes through the points $(p, +f(\alpha)\sqrt{(n-p)})$ and $(n, 3f(\alpha)\sqrt{(n-p)})$ and line B goes through the points $(p, -f(\alpha)\sqrt{(n-p)})$ and $(n, -3f(\alpha)\sqrt{(n-p)})$. Values for $f(\alpha)$ were computed; notably $f(0.05) = 0.948$. A diagnostic test may thus be devised which rejects the null if some portion of the plot is above line A or below line B. By simple geometry the equations of lines A and B may be deduced as $w_t = f(\alpha)\sqrt{(n-p)} + f(2f(\alpha)(t-p), \sqrt{(n-p)})$ and $w_t = -f(\alpha)\sqrt{(n-p)} - f(2f(\alpha)(t-p), \sqrt{(n-p)})$ respectively. The approach for the cusum of squares test is similar, but based on a slightly different rationale

$$\sum_{t=p+1,j} v_t^2 \sim \chi^2_{j-p} \Rightarrow \sum_{t=p+1,n} v_t^2 \sim \chi^2_{n-p}$$

$$\sim s_j = f(x_1, x_1 x_2) \text{ such that } x_1 \sim \chi^2_{j-p},\ x_2 \sim \chi^2_{n-j}$$

$$\Rightarrow s_j \sim \beta(j-p, n-j), \text{ following Rao (1973).}$$

Rao observes that for a $\beta(p,q)$ variate, it has an expectation of $f(p, p+q)$. It follows that $E(s_j) = f(j-p, n-p)$. So, if we consider a plot of s_j against j it should be close to a line going through $f(j-p, n-p)$ for all j, known as the mean value line. By simple geometry, the equation of the mean value line is, hence

$$s_t = f(t-p, n-p)$$

Brown, Durbin and Evans (1975) show that for any required significance level, α, the probability that the plot crosses either or both lines

$$s_t = f(t-p, n-p) \pm C_0(d)$$

is equal to α. They tabulate values of C_0 and so a diagnostic test may hence be deduced. It could in principle be extended to other LUS residual vectors, the problem becoming statistically more difficult, however. Garbade (1977) in statistical simulations concluded that the cusum of squares test was more powerful than the cusum test and that not even the former is very powerful

against changes in β.

A final application of alternative disturbance estimators, which uses LUF residual vectors, is to computing the distribution of Von Neumann ratios. As the Von Neumann ratio is a linear transformation of the Durbin-Watson test statistic, this could either be regarded as an appplication to either misspecification or serial correlation testing. The exact distribution of the Von Neumann ratio for least squares residuals is data dependent although, given a particular X matrix, it may be computed exactly.

Given a vector of LUS residuals, the distribution of the corresponding Von Neumann ratio may be computed exactly. For n-p BLUS residuals the Von Neumann ratio is $Q = \frac{\sum_{i=2}^{n-p}(u_{1\alpha}-u_{1\alpha-1})^2}{(n-p-1)e_1'e_1} = \frac{u'_1Au_1}{(n-p-1)e_1'e_1}$ where A is the appropriate elementary matrix. Press and Brooks (1969) derived significance limits of Q for n-pϵ{2...60}, and showed that asymptotically, $Q \sim N(2, \frac{4}{n-p})$, an asymptotic approximation valid for n-p at least around 60. Hence one may test for serial correlation as proposed by Theil (1971).

It is in this application that writers such as Abrahamse and Louter (1971) would tend to argue that LUF residual vectors are especially appropriate. The difficulty in computing Von Neumann ratios lies in data-dependency not in whether the dispersion matrix of disturbance estimators is scalar or not. Since the BLUS residual vectors satisfy weak optimality in a more restricted class than the LUF residual vectors of Abrahamse and Koerts (1971) it seems plausible that using LUF residual vectors will entail a gain in power, although the formal justification for this claim relies on Monte Carlo simulations. Besides, given a typical X matrix for a certain field, LUF residuals are uniquely determined, unlike BLUS residuals. Given a time series where differences are small by comparison to the level predictor variables, LUF residuals may be derived by the procedure referred to. In this case, where A is as defined in the section on LUF residuals the Von Neumann ratio is $Q' = \frac{v'Av}{v'v}$ Let $l_1 \ldots l_{n-p}$ be the eigenvalues of K'AK. Then Koerts and Abrahamse (1969) show that $Q' = \frac{\sum_{i=1}^{n-p} l_i\varsigma_i^2}{\sum_{i=1}^{n-p}\varsigma_i^2}$ where $\varsigma = (\varsigma_1 \ldots \varsigma_{n-p})$, $\varsigma \sim N(0, \sigma^2 I)$. Let Q be the orthogonal matrix the columns of which are the eigenvectors of A. By orthogonal diagonalisation

$D = diag[\partial_1 \ldots \partial_n] = Q'AQ$, where $\partial_1 \ldots \partial_n$ are the eigenvalues of A.

$\Rightarrow A = QDQ'$

$\Rightarrow K'AK = K'QDQ'K$

But Q is the matrix $[h_1 \ldots h_n]$, K is the matrix $[h_{p+1} \ldots h_n]$ and $h_1 \ldots h_n$ are of unit length and pairwise orthogonal. So $K'Q = [O^{(n-p)}_{(p)} I_{(n-p)}]$ where $O^{(n-p)}_{(p)}$ is of order n-pxp and $I_{(n-p)}$ is of order n-pxn-p, being zero and identity matrices respectively.

$\Rightarrow K'AK = [O^{(n-p)}_{(p)} \; I_{(n-p)}] \; D \; \begin{pmatrix} A & O^{(n-p)}_{(p)} \\ I_{(n-p)} \end{pmatrix}$

$\Rightarrow K'AK = \begin{pmatrix} A & CO2 \\ O_{(p)}, O_{(n-p)}, O_{(n-p)}, J \end{pmatrix}$ where J is $diag[\partial_{p+1} \ldots \partial_n]$

$\Rightarrow Q' = \frac{\sum_{i=p+1}^{n} d_i\varsigma_i^2}{\sum_{i=p+1}^{n}\varsigma_i^2}$

This is the Durbin-Watson upper bound d_u, apart from the multiplicative constant. Durbin-Watson tests may hence be conducted. This result also provides some explanation for why statistical simulations have tended to suggest that the actual distribution of the Durbin-Watson test statistic is closer to d_u than d_l.

Abrahamse and Koerts (1971) ran some statistical simulations to compare

the power of this procedure with the BLUS one in serial correlation with slow trending time series. The former dominated the latter in power. The strength of the argument for the LUF test that follows from this is clearly however greatly blunted by the need in this procedure to find a typical X matrix and hence a suitable Ω matrix. The procedure breaks down if one cannot be found. As the theory of LUF residuals is based on Ω being fixed a priori it follows that the typical X matrix must be fixed in advance. This may be a quite unreasonable requirement, and so the alternative approach based on BLUS residuals may be preferred.

Jonathan Wright

Notes

(1) The term estimator is used here in a nonstandard way, not to estimate a parameter in a probability distribution but to estimate a value taken on by a random vector, ε.

(2)The variance-covariance matrix of a, a vector of estimators of a random vector ε is defined as \o(Σ, I)(a), E[(a-ε)(a-ε)']. This is again a non-standard practice, following logically however from (i). The matrix E[(a-E(a))(a-E(a))'] is termed the dispersion matrix of a, V(a).

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Proceedings of the Student Economic Workshop 1989/90

"Can capitalism survive ?" was the question that Paul Devereux addressed at the first Student Economic Workshop meeting of the year (Nov 18). Events in Eastern Europe have cast serious doubts over the future of communism , which rather ironically lends more relevance to the speech than Paul could possibly have imagined when delivering it . If communism is to survive only as a historical footnote , the future of capitalism , as the main alternative , is of even greater relevance to us all .Part of the essence of the discussion was that economics and capitalism are inextricably linked . Paul attempted to show this by reviewing the history of the two , showing their side-by-side development . From this it was inferred that should capitalism decline , economics as a science would decline with it . However , this does not give enough credence to economics as an independent entity with a separate capacity to change and adapt to its environment . Economics can and does exist outside capitalist systems .

Even allowing for their independence , economics would have to adapt to the system that would replace capitalism , should it ever decline . As Paul correctly pointed out , the nature of the change would depend on the nature of the system which would replace capitalism . Schumpeter and Galbraith came up with the idea that capitalism would ultimately die of its own success . Continual increases in market concentration would eventually lead to one "super corporation" . Whether such a situation would be 'capitalist' is a question to which perhaps , an inadequate emphasis was put in the presentation . Anti-trust legislation should ensure that such a situation will never occur - while , as pointed out , this process of increasing industrial concentration will have serious ramifications for economic theory - especially the fundamental emphasis of profit maximisation . The degree to which the process can continue in the future is questionable .

Green economics forms the basis of the other main reason proposed for the decline of capitalism . The exhaustive nature of our natural resources and the pollution caused by the "take , make , and throw away" industry , it is argued , will force a change of attitudes and a change from the capitalist system . While Paul acknowledged the possibility of neuclear fusion or the utilisation of solar power to solve our resource problems , he failed to acknowledge capitalism's ability to adapt to its new surroundings . Capitalism has gone ozone and environmentally friendly . Industry , will adapt to changes in consumer preferences as public awareness about the environment is heightened - it has no choice . Capitalism will change , as Paul suggested , and economics with it . However , many attributes of capitalism will survive , because their flexibility and success leaves no purpose for their redundancy . Karl Murphy replied to Paul's paper.

The second seminar (Dec 8) was on proposals for a minimum wage. The main paper was by Billy Stamp and Joe Smyth replied. Next was a special seminar on " Measuring Poverty in Ireland" (Jan 25) with Dr Sean Barrett and Dr Paddy Geary of Maynooth being the main speakers. On Feb 2, Philip Lane presented a paper on the macroeconomic implications of the 1990 budget. The Rational Expectations Hypothesis was the subject of debate between Tony Annett (opposing) and Paul O'Connell (proposing) on Feb 14. The papers by Billy Stamp, Philip Lane and Tony Annett may be found elsewhere in the Review. Forthcoming seminars include a presentation on the implications of German unity by Joe Smyth.

Kevin Murray